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TORREYA

A Monthly Journal of Botanical Notes and News

JOHN TORREY, 1796–1873

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

MARSHALL AVERY HOWE

Volume III.

NEW YORK

1903

Vol. 3
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Page 116, 15th line, *for* at, *read* near.

Page 116, 15th line, *for* 17, *read* 16.

Page 123, 3d line, *for* Chowan, *read* Nottoway.

Page 123, 4th and 14th lines, *for* Mehenin, *read* Meherrin.

Page 145, in footnote relating to date of issue of September TORREYA, *for* September 6, *read* September 26.

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JOHN TORREY, 1796–1873

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MARSHALL A. HOWE
New York Botanical Garden
Bronx Park, New York City

Vol. 3 No. 1

TORREYA

January, 1903

NOTES ON SOME SOUTHERN ILLINOIS PLANTS

By H. A. Gleason

During several collecting trips to southern Illinois the writer has been able to make field notes on a number of rare or interesting species. The flora of the extreme southern part of the state is essentially different from that of the central and northern portions, in that the austro-riparian flora finds there its northern limit, and the unglaciated hills and vertical cliffs afford edaphic conditions unlike anything else in Illinois. Consequently, some three hundred species of the Illinois flora are confined to that region.

The only station in Illinois for *Pinus echinata* Mill. is a small area in Union County locally known as the Pine Hills. The soil there is thin and rocky, and underlaid by Silurian limestone. Erosion has cut deep ravines with steep rocky sides and sharp narrow crests. These hills reach a height of four hundred feet above the adjoining bottoms of the Mississippi River, or about seven hundred and fifty feet above sea level. Along the narrow crests of these hills the pines are growing, in company with hickory and scrub oak. Some of the largest specimens are three feet in diameter and eighty feet high. Along the sides of the hill their growth is stunted, and none is found more than a hundred feet from the crest. Cones are produced abundantly, and healthy seedlings are common.

Along the steep rocky hillside below the pines is the only station in Illinois for the pink azalea, *Azalea nudiflora* L. The shrubs are usually from three to six feet high, and are fairly abundant.

Manuals give but two stations for *Phlox Stellaria* Gray—the cliffs of the Kentucky River and southern Illinois. The latter

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might be further limited to Grand Tower, Jackson County, where it was first observed by Professor French many years ago. In May, 1902, I found it blooming there abundantly. A limestone ridge called the Devil's Backbone extends for about a mile along the east bank of the Mississippi. Its eastern slope is forested, but its western, receiving the full effect, both of the afternoon sun and of its reflection in the water, presents a succession of vertical sun-burned cliffs, and in their crevices grow the plants of *Phlox Stellaria*. Hemispherical tufts a foot in diameter, of dull green leaves and light blue flowers, grow over the face of the cliff wherever there is a fissure an eighth of an inch across. Longer fissures are marked with rows of the plants and a geologist might observe the dip of the strata by noticing the growth of the *Phlox*. It shows several xerophytic structures, short stiff stems, and narrow coriaceous leaves with inrolled margins. No plant, however, except a pronounced xerophyte, could live on these bare cliffs. Even in May the rocks are so hot that they are uncomfortable to the touch in the afternoon, and in July the heat is still greater. By that time the seeds of the *Phlox* have ripened and all that remains of the plant are the wiry stems and brown leaves.

Growing with the *Phlox* are some other xerophytes such as *Polypodium polypodioides*, *Cheilanthes Fée*i, *Opuntia humifusa*, *Pellaea atropurpurea*, and *Solidago Drummondii*. The last two grow especially in pockets in the rock, and a cavity holding no more than a tablespoonful of soil will support a large plant of *Solidago* or a dozen fronds of *Pellaea*. This species of *Solidago* grows in Illinois only along the bluffs of the Mississippi River, and so far as observed, only on limestone cliffs.

Polypodium polypodioides in southern Illinois is generally xerophytic in nature, and prefers sandstone cliffs. It may grow, however, on damp shaded cliffs in company with *Camptosorus rhizophyllus* and *Asplenium platyneuron*. I have never seen it upon trees in this State.

Heuchera parviflora Bartl. reaches in Illinois its northern limit. Its favorite habitat is under a damp sandstone cliff, so shaded that the sun's rays seldom or never strike it. Here it grows in abundance with *Marchantia* and other Hepaticae, or an occasional

plant of *Camptosorus*. In the large fissures or caves in the rocks plants of the *Heuchera* are found growing farther from the light than any of the other shade-loving forms.

Sedum telephioides Michx., a plant of the southern Appalachian region was found in August, 1902, in Pope County, where it grows in the thin soil at the tops or on ledges of sandstone cliffs. While this was its first collection in the state, it is also interesting as an example of plant distribution. The migration route by which it has reached Illinois is evidently across the hill region of southern Ohio, the Knobs of Indiana, and the Ozark Hills of Illinois. This affords a continuous route along which the plant might find conditions resembling those of the mountains from which it came.

University of Illinois.

LOUISE BRISBIN DUNN

By Ada Watterson

In the sudden death of Miss Louise Brisbin Dunn, tutor in botany in Barnard College, which occurred on December 18, the department with which she has been so long identified has suffered a serious loss.

Miss Dunn's connection with Barnard began in 1893 when she entered as a special student in the department of botany which was then under the direction of the late Professor Emily L. Gregory. Becoming interested in the regular college work, Miss Dunn made up that winter the amount of Greek required for entrance and matriculated as a regular student in the fall. She was graduated in the spring of '97 with the highest standing attained by any student in the college up to that time. She was of course among those who were elected to Phi Beta Kappa when a chapter of that organization was established in the college three years later. After her graduation Miss Dunn was appointed assistant in botany in Barnard College, and during that year and the next carried on work in botany, zoölogy and chemistry leading to the Master's degree, which she received in June, 1899. At that time she was also advanced to the rank of tutor, which position she held at the time of her death. In the summers of

1899 and 1900 Miss Dunn worked in the Biological Laboratory at Cold Spring Harbor, serving there also this past summer as assistant in ecology. The intervening summer she spent in France, working part of the time in the Marine Laboratory at Roscoff, Brittany, through the courtesy of M. Robert, the director.

In the department with which she was connected Miss Dunn's strong, bright personality and her tireless enthusiasm were no small inspiration to her colleagues. It was her constant endeavor to promote in every way the best welfare of the department and her suggestions were always of value. She was intensely interested in her work, and she also possessed in unusual measure the ability to share this interest with her students, and to impart to them her own enthusiasm. Not only in her own especial field, however, was her influence felt, but also in the college at large, where among the students she was always ready with her kindly sympathy to help them, so far as it lay within her power, out of any of their difficulties. Her prompt and keen perception of all the bearings of a question under discussion, her logical clearness of statement and the inimitable wit which vivified everything she said made her a valued friend and leader. Possessing marked literary ability herself, she delighted in a wide range of interests, and her criticism of a book or a picture was always worth remembering.

No results of Miss Dunn's scientific work have been published. A study of the development of the embryo in *Delphinium* formed the subject of her thesis presented for the Master's degree. During the past year she made numerous notes on experiments concerning the influence of external factors on the growth of the moss sporophyte, work which she had hoped to finish in the coming spring. Her work must be regarded more in the light of promise for the future, a promise so bright and so well-founded that it gives to all who knew her additional cause for sadness in her sudden death.

Miss Dunn was in the middle of her term of office as vice-president of the Associate Alumnae of Barnard College. She was also a Fellow of the American Association for the Advancement of Science, and a member of the Torrey Botanical Club and of the Barnard Botanical Club.

VACATION OBSERVATIONS.—III

By Francis E. Lloyd

Behavior of the Spores in Polytrichum. — A remarkably pretty demonstration of the behavior of the spores during their dissemination may be had in *Polytrichum* if one examines the dry sporogonium after the operculum has been removed. The observer must hold the seta between the thumb and finger of one hand with the diaphragm of the capsule opposite the eye, the capsule being so placed that the light shines through the diaphragm and at the same time so tilted that the dry spore mass falls against it. The seta must now be gently tapped so as to make the capsule vibrate, when the spores will escape between the shrunken teeth of the peristome and be scattered. The point of special interest here is the manner in which the spore-mass rolls around in the capsule and falls, in this way and that, against the diaphragm. The spores appear, in their movements, as of considerable weight, an illusion caused by the extreme ease with which they roll over one another. This, of course, is due to their very great dryness, and, possibly, to surface characters.

The Color of the Spores in Polytrichum. — The writer does not recall that it has been heretofore pointed out that the ripe spores of *Polytrichum commune* and those of *P. Ohioense* differ very markedly from each other in color when seen *en masse.* Indeed, the amount of difference is so great that the beginner would be able to distinguish the species very readily. In *P. commune* the color is yellow-green ; in *P. Ohioense,* brown-yellow. Corresponding differences in the structure of the spores are seen on microscopic examination. Those of the former are smaller, and more densely filled with protoplasm, and the coloring more readily seen than in those of the latter species ; the vacuole is very much larger, also, in the spore of *P. Ohioense.*

Destruction of Mosses by Fungi.—Apparently but very little attention has been directed to the relations of mosses and fungi. Whether any specific diseases in mosses are caused by fungi is an open question. Nevertheless, under certain conditions, such as prevailed during July of last year, in northern Massachusetts,

large patches of *Polytrichum commune* were killed by a fungus, probably a *Mucor*-like organism, which grew like a white mat, smothering the moss turf, and causing the plants to die rapidly and turn brown. Just what the action of the fungus is, remains to be elucidated by investigation, but it seems probable that it kills the moss chiefly by cutting it off from the air.

Similarly a clump of *Dicranum scoparium* and a few neighboring plants of *Polytrichum Ohioense* were observed near Hyannis, Mass., to be attacked by a myxomycete. Some of these low forms creep up upon living plants before sporulation takes place. In this instance death of the capsules was induced with some amount of distortion. The materials promise interest on further study, it being of importance to determine whether in this matter the myxomycete is purely or rather superficially epiphytic, or whether it in some way attacks the deeper-lying tissues. The latter, judging from our present knowledge, is improbable.

Hypomyces. — It is worth mention that the well-known fungus *Hypomyces Lactifluorum*, parastic on *Lactarius*, is able to propel its spores to a distance of 1½ inches or more. This was determined in the usual fashion of obtaining a spore print. The amount of spore dust obtained in this way is quite surprising.

Having used the dried commercial material of the truffle for anatomical work, I was led to cut into small strips an affected plant of *Lactarius*. The pieces were dried, and then used dry for sectioning by free hand. *Lycoperdon* was treated similarly, with the result that when the curled dry sections are mounted for microscopic examination they are quite satisfactory for ordinary work.

In this way, therefore, the collector may preserve material for anatomical use quite successfully with little trouble.

SHORTER NOTES

Leaves of the Skunk Cabbage. — Last July I was much impressed by the size of some leaves of the skunk cabbage growing on Long Island near the College Point water-works. The largest leaf measured 26½ inches long by 19½ broad. Is there record of any larger? A. J. Grout.

360 Lenox Road,
Brooklyn, N. Y.

A new Family of the Basidiomycetes.—**Xylophagaceae**. This family is based on *Xylophagus* Link, Berl. Mag. 3: 38. 1809 (*Merulius* Hall.) and allied genera formerly included in the Polyporaceae. Its distinguishing character is a gelatinous and at the same time porous hymenium. Its genera may be grouped under three subfamilies: The **Favolaschieae,** including plants wholly gelatinous both in context and hymenium, the **Xylophageae,** in which the context varies from semi-gelatinous to firm or fibrous and the **Gloeoporeae,** with firm fibrous context and a hymenium of deep cohering tubes instead of shallow reticulations. This last group approaches the Polyporaceae, but differs by reason of its separable gelatinous hymenium. The types of the three subfamilies mentioned above are *Favolaschia* Pat., *Xylophagus* Link and *Gloeoporus* Mont.

William Alphonso Murrill.

New York City.

A new Oak.—**Quercus Rydbergiana**. A small shrub about 1 m. high: bark of young branches grayish-brown, puberulent, that of the older branches and trunks gray; bud-scales bright ferruginous, slightly puberulent: petioles 3–5 mm. long, densely puberulent; leaf-blades rather long and narrow, but small, the larger about 36 mm. long and 15 mm. broad, most smaller, not over 25 mm. long, firm, lobed about half-way to midrib, lobes obliquely triangular, with rounded margins and a mucronate tip, upper surface pale bluish-green, with rather abundant pale yellow stellate pubescence, lower surface pale yellowish-green, with abundant yellowish stellate pubescence; strongly veined but hardly reticulate; fruits solitary; cup hemispheric, covering about one third of the acorn, 8 mm. broad; scales with produced blunt reddish tips, the lower scales corky-thickened on the back; acorn barrel-shaped, rather obtuse but not apically depressed, about 10 mm. long, light brown.

Hab. — Common at Las Vegas Hot Springs, New Mexico, alt. prox. 7000 feet. It is allied to *Quercus Fendleri*, but is easily distinguished by the smaller leaves with less pointed lobes. Las Vegas Hot Springs is a good locality for oaks; I collected there also *Q. Novo-Mexicana* (A. DC.) Ryd., *Q. nitescens* Ryd., *Q. Gambelii* Nutt., *Q. Fendleri* Liebm., *Q. Emoryi* Torr., and *Q.*

grisea Liebm. At Beulah, in the Canadian zone (prox. 8000 feet), the oaks were *Q. Gambelii* Nutt., and *Q. Utahensis* (A. DC.) Ryd. The new oak is named after Dr. Rydberg, who has made it possible to study the Rocky Mountain oaks with some satisfaction. The type of *Quercus Rydbergii* is in the N. Y. Botanical Garden herbarium.

T. D. A. Cockerell.

East Las Vegas, New Mexico.

Insect Visitors of Scrophularia leporella Bicknell. — Some years ago when this common and widespread species was considered, along with *Scrophularia Marylandica*, as merely a variety of the Eurasian *Scrophularia nodosa* of Linnaeus, I had several patches under observation with especial reference to their cross-fertilization by insects.

Our plants, as is well known, are proterogynous, and Lubbock * states that *Scrophularia nodosa* is fertilized by wasps, the honey being distasteful to bees, thus accounting for the stigma becoming functional first, as wasps usually work downward on a flower-cluster. This was distinctly not the case with our species, for of the few insects identified † five (*i. e.*, *Bombus consimilis* Cress., *Apis mellifica* L., *Halictus ligatus* Say, *Andrena* sp., and *Augochlora humeralis* Patton) were bees and only three (*i. e.*, *Vespa maculata* L., *Vespa vulgaris* L., and *Polistes pallipes* St. Farg.) were wasps, and of these the *Bombus* was the most abundant. While the genera *Halictus*, *Andrena*, and *Augochlora* contain short-tongued bees they seemed to have no trouble in working the *Scrophularia* blossoms. Several other unindentified species were also observed visiting these flowers. I am not familiar with the current view as to whether wasps work downward on flower-clusters, but the above species most certainly did not in my experience.

It is interesting to note the admirable manner in which the economy of the flower is arranged for insect fertilization, the corolla forming a veritable saddle for the insect. The style in the young flower curves upward and leaves but a narrow space

* Flowers, Fruits, and Leaves, p. 16.

† Identifications by Professor John B. Smith.

between the stigma and the barren stamen, through which opening the insect is obliged to obtain the honey. The glandular hairs of the pedicels are absent some distance below the blossom thus offering no interference to the alighting insect. When the stamens uncoil and the pollen ripens the style becomes reflexed and the somewhat rigid stamens are forced against the insect visitor, the weight of the latter, who is always obliged to work from below, causing the blossom to sag greatly.

EDWARD W. BERRY.

PASSAIC, N. J.,
December 2, 1902.

REVIEWS

A recent Monograph of Campanula rotundifolia and its Allies

A monograph of *Campanula rotundifolia* and its allies has recently been issued from the University of Vienna by J. Witasek. It appears under the title "Ein Beitrag zur Kenntnis der Gattung Campanula."* It treats only of the species belonging to the *C. rotundifolia* group. This group is divided into 3 series, 15 superspecies and 32 subspecies. *C. rotundifolia* in a broad sense, *i. e.*, taken as a superspecies, contains 11 subspecies. Of these *C. rotundifolia* in limited sense is distributed over almost the whole of Europe and northern Asia and also credited to the southwestern United States and Mexico. The other European species are local or of very limited range, one from France and Switzerland, one from Switzerland and six from Austria, the Turkish peninsula and Italy. North America is credited with six species: *C. rotundifolia* L., *C. intercedens* Witasek, *C. petiolata* DC., *C. dubia* DC., *C. Giesekiana* Vest, *C. heterodoxa* Vest.

Campanula intercedens Witasek is our so-called *C. rotundifolia* of the eastern states. Witasek points out the following characters to distinguish it from *C. rotundifolia* of Europe: The tall habit, the long one-flowered almost erect branches of the inflorescence, the lighter color of the plant, thinner leaves and especially the hairiness of the stem. In *C. rotundifolia*, if hairy at all, the hairs are scattered all around the lower portion of the stem, while in the American plant they are confined to definite decur-

*Abh. K. K. Zoöl.-Bot. Gesellsch. Wien, 1^3: 1–106. 1902.

rent lines. The author could have added another striking difference in the basal leaves, but these were probably unknown, as they are most commonly lacking in herbarium specimens. In *C. rotundifolia* the basal leaves are small, thick, crenate-dentate and with shallow basal sinuses. In *C. intercedens* they are usually large, thin, with large sharp teeth and deep rounded basal sinuses. *C. intercedens* inhabits usually rocky places, while the European *C. rotundifolia* is a meadow plant. While the former is the common plant of the eastern states and Witasek does not cite a single specimen of *C. rotundifolia* from that region, there are some specimens indicating the existence of the latter in the East, probably as an introduced plant. In the Columbia University herbarium there is one from Canaan, Conn., collected by W. H. Leggett, which I must refer to *C. rotundifolia*, and another from Milford, Pa., by Dr. Britton, which, also, probably belongs with it.

Campanula petiolata DC. is the common plant of the Rocky Mountain region. It is nearer the European *C. rotundifolia* than the preceding, and if hairy on the stem at all, the hairiness is not confined to lines, but extends all around. It is a stricter plant than *C. rotundifolia*, with thicker leaves, of which the uppermost are almost erect and the lower blunt, of a lighter hue and with more unequal calyx lobes. The basal leaves are more inclined to be ovate, rather than round-cordate.

The range of *Campanula rotundifolia* in America, Witasek limits to Mexico and New Mexico, with the addition of one locality in Colorado and one in Idaho. It is strange if *C. rotundifolia*, a native of the wet meadows of northern Europe and Asia and the mountains of South Europe, should here be limited to the Texano-Mexican region. The few New Mexican and Mexican specimens that I have at hand, I admit, resemble much the European plant in general habit and hairiness, but it is taller, more slender and strict. In all, the basal leaves are lacking. Maybe they would furnish good characters to distingush the Texano-Mexican plant. In the herbarium of the New York Botanical Garden there is a duplicate of the number cited from Idaho, viz., *Sandberg, MacDougal & Heller, 337*. This is nothing but *C. petio-*

lata. Our specimens are not even hairy, which the Berlin herbarium specimen, which Witasek saw, evidently is. *C. petiolata* is generally perfectly glabrous. In the Rockies, especially in Colorado, are found forms densely pubescent on the lower part of the stem and less so on the leaves. Otherwise I have found no character to separate this form from the typical *C. petiolata*. Maybe the author of the monograph has confused under the so-called American *C. rotundifolia* the hairy form of *C. petiolata* and an undescribed species from Mexico and New Mexico.

Campanula dubia DC. is the same as *C. Scheuchzeri* and *C. rotundifolia* var. *arctica* of Gray's Synoptical Flora, at least in part. It is more closely related to *C. rotundifolia* than to *C. intercedens*. It is usually one-flowered with erect flower buds, with thin broad linear to oblanceolate stem-leaves, and round or rarely reniform basal leaves, large flowers and long sepals. It grows from Newfoundland to the White Mountains of New Hampshire.

Campanula Giesekiana Vest has gone under the name of *C. Scheuchzeri*, *C. rotundifolia* var. *linifolia* and var. *arctica*, and has not been separated from the preceding, but is distinguished from that species as well as from the others of the *C. rotundifolia* group by the short and broad hypanthium, which in flower is much broader than high. It is usually a low plant, densely leafy below and naked above, usually one-flowered. The lower stem-leaves are often spatulate and obtuse. *C. Giesekiana* is an arctic plant growing in Europe and Asia, as well as in America, where it has been collected in Greenland, Labrador and on the islands of the Baffin's Bay region.

Campanula heterodoxa Vest is, according to Witasek, the same as *C. rotundifolia Alaskana* of Gray's Synoptical Flora, and is a native of Alaska and Eastern Asia. It is a tall plant with large flowers and resembling a luxuriant *C. rotundifolia*, but is characterized by its long spreading or reflexed calyx-lobes. To me it seems to consists of two forms, one with broad oblanceolate lower stem-leaves, the other with all stem-leaves narrowly linear and flaccid.

A few words may be said about the monograph in general. The paper, type and printing are excellent. A full synonymy

is given under each species and the references are given in an unusually clear way. The diagnosis of each species in Latin is long enough to give a good description and short enough so as not to be cumbersome. The general notes in German are full of valuable information, and presented in a concise and clear way. Even the American species are treated in a way very unlike the unsatisfactory one in which Europeans usually monograph American plants. If this monograph is compared with that of *Oenothera* by Léveillé, its superiority in quality is quite evident.

After I had glanced over the 106 pages of the text and studied what was of most interest to me, especially all that related to American botany, I turned to the preface and here awaited me the greatest surprise. The author is a woman. On the title page the author's name is given as J. Witasek without any title whatever, and in the text the personal element is as it ought to be so eliminated that there is no indication of the gentler sex. Only the first line of the preface contains the word "Verfasserin," followed by a few "sie" and "ihre." Not that I believe a woman incapable of a good piece of work, far from it; but in Europe there are but few women that receive a university education and besides their education is generally very unlike that of men. Therefore, the monograph indeed is a credit to both the author and her sex, as well as to the university where the work was done.

P. A. Rydberg.

PROCEEDINGS OF THE CLUB

Tuesday, November 11, 1902

The meeting was held at the College of Pharmacy; thirteen persons present; Dr. Rusby in the chair.

The scientific program of the evening consisted of a paper by Dr. L. M. Underwood on "The Gold and Silver Ferns." Dr. Underwood said that characters based upon position and form of sori and indusia have perhaps been emphasized too much in classification; in some species the indusium may be developed or may be wanting on the same plant. There is now a tendency to return to the recognition of the fibro-vascular system as an

element in classifying ferns. Mainly free-veined ferns occur in Devonian and Carboniferous remains. Anastomosing veins seem to have developed later; and even now, they form the predominant feature in but two of the ferns of our northern states, *Onoclea sensibilis* and *Woodwardia areolata*. The pinnate and flabellate types of venation are very distinct, but are connected in appearance by a modification of the last type with successive alternations of its dichotomy forming a prolonged axis. The ferns known as gold and silver ferns were included in 1811 in the genus *Gymnogramme*. Some twenty genera have since been segregated from it, some of them on sufficient grounds. Many garden hybrids and horticultural varieties have been developed. With the exception of a species in Madagascar, the group is confined to the tropics of America, where the species known as the silver fern is perhaps the most common fern known. The goldenback fern of California is perhaps most familiar to ordinary knowledge; its range is from Alaska to Lower California, but not eastward of the Sierras. In life it is of a bright golden-yellow beneath (often replaced by silvery powder), a brilliant green above; in the dry season it coils up involutely, exposing only the under surface, which is covered by its peculiar golden waxy powder.

This and other ferns of the arid region prevent too great transpiration of water by developing waxy or resinous powders, or by layers of wool or of scales. A Mexican species, *Notholaena aurantiaca*, was exhibited, which combines two protections, powder and scales. The silver fern of our arid Southwest finally becomes almost chalky beneath; it becomes coiled almost into a ball in the dry season.

Discussion followed upon the true interpretation of the function of the waxy powder, Dr. C. C. Curtis deeming it to accomplish two purposes, that of plugging stomata and that of reflecting heat. Dr. Rusby recalled the suggestion made by Mr. Charles F. Cox some years ago, to the effect that plant hairs carry on metabolism and aid nutrition.

Dr. Rusby also described the appearance and habitats of several species which he had been familiar with in Bolivia and in our own Southwest; in the Rockies where *Notholaena* and *Cheilanthes*

grow together from the same crevices of rock, they respond to rain with remarkable quickness. In the dry season when everything else is seemingly dead, if a rain should occur, their coiled fronds quickly become bright green, and well expanded, though perhaps curled again into little balls within a few days.

EDWARD S. BURGESS,
Secretary.

WEDNESDAY, NOVEMBER 26, 1902

The meeting was held at 3:30 P. M., at the New York Botanical Garden; Dr. H. H. Rusby in the chair.

Dr. MacDougal spoke on some examples of propagation by bulbils. Two kinds of bulbils were spoken of, namely, those which morphologically are stems, and those which morphologically are roots. He exhibited specimens of *Dioscorea villosa* which bore in the axils of the leaves large bodies described as bulbils of the first sort, and *Ranunculus Ficaria* and *Globba Schomburgkii* which had similarly placed bodies, much smaller, however, and morphologically roots. In any case the bulbils reproduce the plant by germinating after falling to the ground. Drawings of *Lysimachia terrestris* were shown that represented the changes effected in the habit of the plant brought about by being grown in water.

A specimen of the so-called "wood-rose" of Guatemala was also exhibited by Dr. MacDougal. This curious malformation is a hypertrophy of a branch of some Leguminous tree or shrub and is caused by an unknown species of *Loranthus*.

Dr. N. L. Britton made remarks on the plant conditions and the general plant formations of the island of St. Kitts, British West Indies.

The meeting then adjourned and the members of the Club under Dr. Britton's guidance visited the greenhouses and examined some of the plants that have recently been brought by the Botanical Garden from St. Kitts.

W. A. CANNON,
Secretary pro tem.

NEWS ITEMS

Professor J. C. Arthur, of Purdue University, Lafayette, Indiana, is spending a month at the New York Botanical Garden.

Mr. Percy Wilson, museum aid at the New York Botanical Garden, left New York on January 3 for Honduras, where he expects to devote several weeks to making collections.

Dr. Tracy Elliot Hazen has been appointed tutor in botany in Barnard College, succeeding Miss Louise B. Dunn, whose recent death is elsewhere noted in this number of TORREYA.

Dr. John Hendley Barnhart, of Tarrytown, N. Y., has been elected editor-in-chief of the publications of the Torrey Botanical Club, succeeding Professor Underwood, who has resigned on account of prolonged absence from the country.

Mr. C. G. Pringle, keeper of the herbarium of the University of Vermont, who has recently returned from a successful season in Mexico, left on January 8 for Cienfuegos, Cuba, to spend several weeks in making botanical collections and in aiding some experiments in plant-breeding.

Professor L. M. Underwood, of Columbia University, has gone to the West Indies to engage in six months' study of the tropical American ferns. He will be in Jamaica two separate periods of six weeks or more with about the same length of time in eastern Cuba, and at a later date a short period in Dominica. He expects to be absent from the country until September.

The eighth annual winter meeting of the Vermont Botanical Club was held at Burlington, January 16 and 17. The annual address was by Mr. Clifton D. Howe, of the University of Chicago, on "Some Results of Deforestation in Vermont." "Vermont Violets," by President Ezra Brainerd, of Middlebury College; "The Pollution of Water Supplies by Algae," by Dr. G. T. Moore, of the Bureau of Plant Industry, Washington, and "The Thelephorae of Vermont," by Professor E. A. Burt, of Middlebury College, were among the titles of the twenty-one other papers presented.

Mr. K. Yendo in an interesting paper on the "Uses of Marine Algae in Japan," published in Vol. I. of *Postelsia*, the Year Book of the Minnesota Seaside Station, gives some surprising statistics relative to the export of certain dried kelps (species of *Laminaria*) intended chiefly for the markets of China. In 1894, 35,851,245

pounds of "leaf *Laminaria*," and 5,999,134 pounds of "cut *Laminaria*," representing a value of over 600,000 yen were exported. These Japanese Laminarias, mostly of two species, are used as food. The export of agar-agar during the same year amounted to 1,298,422 pounds, valued at nearly 500,000 yen.

The Carnegie Institution has appropriated $8,000 for the fiscal year 1902–'03 to be used in the establishment and maintenance of a desert botanical laboratory. Dr. D. T. MacDougal, of the New York Botanical Garden, and Mr. Frederick V. Coville, of the Bureau of Plant Industry, U. S. Department of Agriculture, constitute the advisory board in relation to the project, and will start on a tour of the Southwest on January 24 to select a site for the laboratory, and to outline other regions to which investigations might profitably be extended. Dr. W. A. Cannon (A B. and A.M., Stanford University, 1899 and 1900; Ph.D., Columbia University, 1902) has been chosen as resident investigator.

The meetings in connection with the American Association for the Advancement of Science in Washington during Convocation Week brought together more botanists than have before been in attendance at any series of public meetings in America. About eighty papers on botanical subjects were presented in addition to half as many more on applied phases of the subject. The three presidential addresses were as follows: Dr. J. C. Arthur before the Botanical Society of America on "Problems in the Study of Plant Rusts"; Dr. D. H. Campbell before Section G, on "The Origin of Terrestrial Plants"; Professor V. M. Spalding before the Society for Plant Morphology and Physiology on "The Rise of Ecology." The Botanical Society of America announced the following grants: To Dr. J. C. Arthur to aid in the prosecution of investigations on the plant rusts, $90.00; to Dr. D. S. Johnson to enable him to continue his work on the endosperm and seed of the Piperaceae and Chloranthaceae, $200.00; to Dr. Arthur Hollick to meet expenses of continuation of investigation of the fossil flora of the Atlantic coastal plain, $150.00.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 28, published in 1901, contained 706 pages of text and 49 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–28 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–27 (1882–1900) are furnished at the published price of two dollars each; Vol. 28, three dollars.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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Vol. 3 No. 2

TORREYA

February, 1903

NOTES ON SOUTHERN FERNS

By Lucien M. Underwood

Osmunda spectabilis Willd.

A study of the royal fern of Europe with our own royal fern, both of which have been growing together for the past three or four years in the New York Botanical Garden, has led to the necessary conclusion that Willdenow's treatment of nearly a century ago is a correct one and we have adopted his above name for our royal fern. The difference between the two plants is very striking from the time when the leaves are first unrolled in the spring. The European plant has dark green foliage which has a firm texture even when young and is sharply in contrast with the thin reddish flaccid leaves so characteristic of our own species, which acquires its firmness long after the leaf has unrolled, though the texture is never the same as that of the European plant. The differences extend throughout the stipe of the two species, which presents marked characters not only in external form but also in internal structure. Mr. George Nicholson, the curator of Kew Gardens, where the two plants have long been under cultivation and observation, has recently told me that he has long regarded the two species as distinct. In herbarium specimens, especially when only the tips of the leaves have been snipped off, these characters of the living plants are obscured. It is very essential to combine life studies of ferns with what has recently been facetiously called "the lie-flat botany," in order to correct the false impressions arising from such a partial view.

[Vol. 3, No. 1, of Torreya, comprising pages 1–16, was issued January 26, 1903.]

Trichomanes Petersii A. Gray

In addition to the Georgia station noted in this issue of Torreya by Mr. Seymour, Professor S. M. Tracy has recently sent me specimens from Saratoga, Mississippi. It is more than likely that this smallest of our native ferns will be found to have as wide a range as *T. Boschianum*, as it is very likely to be passed by as a liverwort. Saratoga is not on the ordinary map, but is in the southern portion of the State in quite a distinct region from the original locality.

Phymatodes exiguum (Hew.)

Polypodium serpens Sw. Nov. Gen. et Sp. Pl. 131. 1788. Not Forst.

Polypodium exiguum Hew. Mag. Nat. Hist. **2**: 458. 1838. Not Griseb. 1864.

Polypodium Swartzii Baker, Syn. Fil. 357. 1868.

Jenman has pointed out * that the above synonymy is the correct one although he retains the genus *Polypodium* in its widest sense, following the Kew practice. He cites also the necessity of renaming *P. exiguum* Griseb. and this seemed to deter him from making the change which he surely recognized as inevitable. As we have used this name in Dr. Small's forthcoming flora, it may be well to indicate the reasons here which the above synonymy will make apparent.

Hypolepis repens (L.) Presl

Professor C. S. Williamson, of Philadelphia, has sent me a single plant of this species collected, in "rich damp woods, Oakland, Fla., August, 1895," and says it bears no evidence of having been introduced. If this is really indigenous as it appears to be, it adds a new genus to the United States. Oakland is near the middle of the peninsula, south of Lake Apopka and in a region which has scarcely been visited by the botanist. It is hoped we may hear further of this interesting locality.

Pteris latiuscula Desv. Ann. Soc. Linn. de Paris, **6**: 303. 1827.

Pteris aquilina Michx. Fl. Bor.-Am. **2**: 262. 1803. Not L.

Pteris caudata Schkuhr, Crypt. Gen. *pl. 96b.* 1809. Not L.

* Bull. Bot. Dept. Jamaica, 4: 199. 1897.

Pteris aquilina β Willd. Sp. Pl. 5: 402. 1810.
Pteris aquilina var. *pseudocaudata* Clute, Fern Bull. 8: 39. 1900.

This fern, species or variety, has troubled systematists for over ninety years, and we confess our inability to add anything to the information already published on the subject other than to call attention to its long synonymy. Mr. George Nicholson has recently expressed to the writer a belief that the so-called *Pteridium aquilinum* of the northeastern States is a different species from *P. aquilinum* of Europe. Surely the species is a variable one in both countries as already seen in such field study as we have been able to give it on the other side of the Atlantic. The present plant has a range from Maryland to Texas, extending up the coast line of New Jersey to Long Island. We have assigned it no place in Dr. Small's forthcoming flora because of present uncertainty regarding its specific or varietal limits.

Anchistea Virginica (L.) Presl, and Lorinseria areolata (L.) Presl

These plants are neither congeneric with *Woodwardia*, of which we must now regard *W. radicans* the type, nor with each other. The former is probably nearest *Blechnum* and the latter is phylogenetically very close to *Onoclea sensibilis*, in fact much closer than to either of the plants with which it has long been generically associated. The acute Presl separated them as above over a half a century ago, and we have followed his lead in Dr. Small's forthcoming Flora of the Southern States. Incidentally the Californian species is distinct from the Mediterranean one, and we shall have to follow Mr. Maxon in giving it Breckenridge's name.

Columbia University, 14 January, 1903.

TRICHOMANES PETERSII FOUND ANEW*

By A. B. Seymour

Trichomanes Petersii is one of three plants recorded in Mohr's Plant Life of Alabama as found only in that state, and I have found no further information except by my own observations.

*Read before the Botanical Club, A. A. A. S., at the Washington Meeting, January, 1903.

This fern was first discovered in 1853 in Winston County, Alabama, by Hon. T. M. Peters and named for him by Dr. Gray. One mat of the plant in the Gray Herbarium sent by Mr. Peters covers a large part of an herbarium sheet. More recently it has been found in two other counties in Alabama. Professor L. M. Underwood has visited the original locality and published an account of it in the *Botanical Gazette.*

In 1901 I spent several weeks, from July to September, collecting cryptogams in the vicinity of Tallulah Falls, Georgia. Several days after my arrival there, I found my way along the course of a small brook into a deep ravine. Toward the lower part of it, on a large boulder I noticed a coating of some moss-like or hepatic-like growth that in some way made me think of *Trichomanes Petersii.* I reached it as soon as I could and found that the green parts resembled the *Trichomanes* fronds. The mat was composed of minute rootstocks. In the approaching dusk I eagerly held up the little fronds against a patch of sky and with my lens made out the little sunken goblet denoting the "fruit" at the apex of the frond.

The boulder upon which the fern was growing was well removed from the brook and so situated that even floods running down the steep hillside after heavy rain apparently could hardly reach the plants. The boulder was so large and abrupt that the only specimens practically accessible to me were those on a side away from the direction of floods; so that apparently the only water available to the plants was that of the moist atmosphere and direct falling rain. A few hundred feet away, in the brook, a pretty cascade soaked me well with its spray while I gathered delicate and luxuriant Hepaticae, but in that spray was no trace of *Trichomanes.* Gathering a liberal proportion of the plants within reach, I hurried to escape darkness in the ravine and reached the inhabited level by an exhausting climb.

Some weeks later, I visited the spot again in company with Mr. W. L. Moss, of the University of Georgia. We first sought the boulder and then took time to explore the banks of the brook. We found an abundance of the fern, somewhat fresher, on rocks doubtless sometimes reached by the waters of the brook.

During ten weeks I examined a good portion of Tallulah territory on my hands and knees with a lens but nowhere else did I find a trace of this fern.

Other ferns of interest found are *Cheilanthes tomentosa*, *Asplenium resiliens* and *Asplenium montanum*.

Cambridge, Massachusetts.

A UNIQUE CLIMBING PLANT

By Roland M. Harper

In a letter written to Dr. Small from the field a few months ago, part of which was published in Torreya last October, I mentioned finding *Andromeda phillyreaefolia* [*Pieris phillyreaefolia* (Hook.) DC.], an Ericaceous shrub, climbing the cypress trees (*Taxodium imbricarium*) in Okefinokee Swamp. As this case seems to be without a parallel, at least in the North American flora, some further description of it may be of interest.

I first collected *Pieris phillyreaefolia* on the morning of August 7 (no. 1475), in a sphagnous bog not far from our first camp in the swamp. There it was a shrub two to four feet tall, as usually described, and there was nothing remarkable about its appearance or habitat. A little later in the day our guide pointed out to us a "vine" which he said climbed the cypresses by creeping under their bark. I lost no time in examining a specimen of this peculiar "vine" (no. 1479), and found it to be the same *Pieris* which I had just collected. Its flowering branches projecting from the tree at various distances from the ground gave it the appearance of a parasite, but by pulling some of it away from the tree I discovered its flattened stems concealed between the inner and outer layers of the fibrous bark of the cypress. No connection between the shrub and the living portion of the tree by rootlets or otherwise was observed, and it is not likely that the *Pieris* derives any advantage except mechanical support from this arrangement. I did not take time to trace the creeping stem down to the ground, nor did I observe where it first penetrated the bark of the tree. The concealed part of the stem

is covered with a soft pale reddish bark, and bears small scattered appressed scales along its two edges. These stems often ascend to a height of thirty or forty feet, and as the leafy branches are usually several feet apart and project only a foot or two they are not conspicuous.

No record of this peculiar climbing habit of *Pieris phillyreaefolia* seems to have yet found its way into botanical literature, but it has not entirely escaped the attention of botanists, for there is in the Torrey Herbarium a specimen collected in Florida by Dr. Chapman in 1840, accompanied by the following note: "This plant in its habit is quite singular. I find it growing on live cypress trees in a pond near this place [Apalachicola?] twenty feet from the ground! as if it was a parasite. I have not made an examination but I suspect that the stems creep under the bark from the ground." For some reason Dr. Chapman failed to mention this interesting observation in his Flora, which was published twenty years later.

A few weeks after leaving Okefinokee Swamp I found the same *Pieris* climbing the same species of *Taxodium* at several points in Lowndes and Brooks Counties, over fifty miles west of the swamp, and collected some more specimens of it (no. 1602) in an extensive swamp between Clyattville and Valdosta, in the former county, on September 2. Before this time it had never been reported from Georgia, but only from West Florida, and a single station in Mobile County, Alabama, where Dr. Mohr found it as a "shrub 5 to 8 inches high."

This association of *Pieris phillyreaefolia* with *Taxodium imbricarium* and no other tree is rather remarkable, as most of our climbers, epiphytes and even many parasites seem to have no particular preference in the matter of hosts. But in this case there is no other tree having a similar habitat which has a bark composed of such long parallel and easily separable fibers.

Pieris phillyreaefolia is described as having a stem alternately leafy and bracted. This character may be an inheritance from a time when its climbing habit was more universal than now, and the bracted portion of the erect stems probably corresponds to the subcortical portion of the climbing stems.

College Point, N. Y.

AN UNDESCRIBED ELEOCHARIS FROM PENNSYLVANIA

By N. L. Britton

Eleocharis Smallii

Culms rather stout, about 6 dm. high and 2–3 mm. thick: summit of the basal sheath oblique: spikelet cylindric, acute, about 1.5 cm. long, as thick as the culm: scales narrowly lanceolate-oblong, acuminate; achene dark brown, obovate, turgid-lenticular, somewhat shining, 1.5 mm. long, rounded at the top; tubercle bulb-like, constricted at the base, one fourth as long as

Fig. 1. *Eleocharis palustris.*

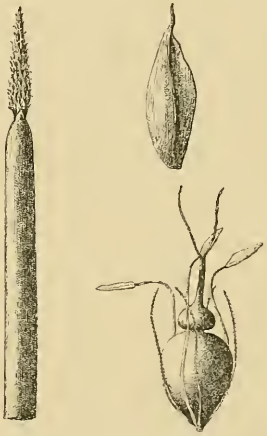

Fig. 2. *Eleocharis Smallii.*

the achene and about one half as wide, rather abruptly tipped: bristles very slender, retrorsely barbed, equalling the achene and tubercle or a little longer.

Harrisburg, Pennsylvania, J. K. Small, September, 1893 (type); McCall's Ferry, York County, Pennsylvania, J. K. Small, September 26, 1891.

The accompanying figures show the relationship of the species to *Eleocharis palustris;* the drawings of *E. palustris* are from a specimen collected by Meisner at Schopfheim, Bavaria; those of *E. Smallii* are from the type specimen in the Herbarium of Columbia University.

Both of the stations cited are along the shores of the Susquehanna River, the plant growing in the water.

A KEY TO THE NORTH AMERICAN SPECIES OF STROPHARIA

By F. S. Earle

1.	Stipe comparatively short and thick (*Psalliota*-like); on the ground.	2.
	Stipe elongated, slender (*Panaeolus*-like); on manure.	8.
2.	Pileus whitish or yellowish-white.	3.
	Pileus yellow, orange or yellowish-brown.	5.
	Pileus green or greenish.	7.
3.	Pileus white, center brownish; lamellae bluish-brown.	*S. caesifolia* Pk.
	Pileus white or yellowish-white; lamellae dark-brown.	4.
4.	Lamellae adnate; stipe short (2.5 cm.).	*S. bilamellata* Pk.
	Lamellae slightly adnexed; stipe 5–10 cm.	*S. Johnsoniana* (Pk.) Pk.
5.	Pileus glabrous, large (8–15 cm.), brownish-yellow.	*S. depilata* (Pers.) Sacc.
	Pileus squamulose, smaller (3–7 cm.).	6.
6.	Pileus ochraceous; lamellae crowded.	*S. squamosa* (Fr.) Quél.
	Pileus orange; lamellae subdistant.	*S. squamosa aurantiaca* (Cke.) Pk.
7.	Pileus verdigris-green, large (8–11 cm.); stipe bluish.	*S. aeruginosa* (Curt.) Gillet
	Pileus greenish to whitish, small (2–3 cm.); stipe whitish.	*S. albo-cyanea* (Desm.) Gillet
8.	Stipe glabrous.	9.
	Stipe floccose or fibrillose.	10.
9.	Stipe glutinous; pileus obtuse.	*S. semiglobata* (Batsch) Gillet
	Stipe dry; pileus umbonate.	*S. umbonatescens* (Pk.) Sacc.
10.	Stipe subviscid; spores large (18–20 $\mu \times$ 10–13 μ).	*S. stercoraria* (Fr.) Gillet
	Stipe dry; spores smaller (12–15 $\mu \times$ 7–9 μ).	*S. siccipes* Karst.

The following species that have been referred to *Stropharia* are omitted:

Stropharia irregularis Pk. Bull. Torrey Club, **27**: 16. 1900. This as I am informed by Professor Peck is probably only a form of *Hypholoma incertum* Pk. in which the veil is somewhat strongly developed. The distinction between *Hypholoma* and *Stropharia* is at best an artificial one since in each there is a fully developed cortina when young.

Agaricus (*Stropharia*) *Howeanus* Pk. Reg. Rep. **26**: 59.

1874. The ferruginous lamellae and light brown spores indicate that this should be placed in *Pholiota* rather than in *Stropharia*. The species was originally referred to *Stropharia* with much doubt, as is shown by the note accompanying the description.

New York Botanical Garden.

REVIEWS

A Course in Botany and Pharmacognosy.*

This book is intended in part to supplement a lecture course in pharmacy though primarily it is designed as a laboratory guide and manual. A work of this character is of unusual interest and concern, coming at a time when there is too often a tendency, in order to forward commercial interests, to substitute inferior and cheaper drugs for those of higher grade or through harmless adulterations to render them uncertain in action and so jeopardize life. It can hardly be questioned that the training of the pharmacist to-day often fails to fit him to discriminate in many cases as to the purity and excellence of the drugs which he is using, and there is frequently to be noted a tendency on the part of the student to be impatient of training along this line of work, holding that a superficial knowledge of the properties and characters of drugs is quite sufficient so long as it enables him to meet the requirements of the law. The widespread adulteration of drugs in this city recently discovered by the Health Board is a case in hand. This conscienceless bartering of human safety for money, however, is perhaps less worthy of attention than the fact that the druggists were ignorant of the character of their stock.

Professor Kraemer has divided his subject into two sections, an introductory part of 100 pages and the main portion dealing with pharmacognosy. The introduction gives a succinct account of the inner and outer morphology of the plant body and comprises a review of the cell forms and contents together with the

* Henry Kraemer, A Course in Botany and Pharmacognosy. 8vo. Pp. 1–384. *f. 1–128.* New York, G. E. Stechert, 1902. $3.50.

morphology and function of the root, stem, leaf and flower This portion of the work is supplemented with 128 figures which unfortunately have been placed at the end of the book. For the most part the illustrations are excellent and would have added materially to the value of the book if incorporated in the text. Some of the cuts, particularly those on the root, are among the best that we remember to have seen, and it should be mentioned that in many instances the figures illustrate the character of the drugs as well as morphological characters.

This first portion of the book will naturally receive the most attention and criticism from botanists. It is inevitable, in so brief a consideration of this broad subject, that statements will be made which require qualifications that must be left for the lecture room. This, in part, also accounts for the rather mechanical treatment of the subject though it would appear that more attention might have been given to the significance of morphological characters. However, the view point of the author must be respected in this consideration and only so much of botanical science is presented as his experience has shown to be necessary to fit the student for an intelligent and scientific understanding of drugs.

Part II., Pharmacognosy, comprises the larger and more important portion of the work and to this attention and criticism should largely be directed. An introductory chapter on collecting, preservation, admixtures, valuations, etc., of drugs is especially timely since gross carelessness and ignorance in these matters is too often seen among druggsists. The remaining chapters deal with Crude Vegetable Drugs, Powdered Vegetable Drugs, and Reagents. Under the first head are discussed the seeds, underground organs, stems, flowers, fruits, leaves and exudations which are of medicinal value. The powdered drugs are classified according to color and under Reagents practical methods of testing and studying are given.

The treatment accorded this portion of the work is worthy of high commendation. Each subject, as seeds, leaves, powders, etc., is systematically arranged and keys are provided for classification and identification. Following this scheme of classifica-

tion there are brought together under each drug the data relating to its constituents, adulterations, botanical and commercial origin, etc. The key for the identification of powdered drugs is of especial importance and will prove of great value to pharmacists. While essentially the scheme originally published in the Proceedings of the American Pharmaceutical Association in 1898, and for which the Ebert and Maisch prize was awarded to Professor Kraemer, it will be noted that it has been substantially recast and elaborated and appears for the first time accompanied by a key and index.

This systematic description of drugs after the manner of the botanical systematist, appearing for the first time in a work of this kind is the most important and valuable feature of the book, and will prove to have great advantage over the plan of treatment given in pharmacopoeias.

CARLTON C. CURTIS.

PROCEEDINGS OF THE CLUB

TUESDAY, DECEMBER 9, 1902

This meeting was held at the College of Pharmacy; Dr. Rusby in the chair; 12 persons present.

The deaths of two members were reported by the secretary, of the Very Reverend E. A. Hoffman, June 17, 1902, and of Dr. T. F. Allen, December 5, 1902. Resolutions in honor of the latter, a vice-president and founder of the Torrey Club, are in preparation, and his funeral at St. Thomas' Church on December 8, was attended by representatives of the Club.

One new member was elected, Mrs. Frank E. Curtis, 78 Orange Street, Brooklyn, N. Y.

The scientific program followed. The first paper was by Professor A. D. Selby, on "Cultures of the Grape-rot Fungus," with exhibition of culture-tubes containing its fully developed perithecia, spore-sacs and spores, derived from pycnospores upon the grape leaf. This fungus has menaced the grape industry in Ohio, producing rotting of fruit and spotting of leaf.

The second paper, by Dr. H. H. Rusby, was on "The Flora of the Orinoco Delta," a delta extending about 200 miles along the sea, and as far inland if we include the region of rocky islands and deep rocky river channels in addition to the area of silt-deposit. It is doubtful if the part visited by Dr. Rusby had been botanically explored before his visit. Its characteristic features are :

1. A hill flora which covers islands never submerged and rocky banks of the river toward the interior : trees and Bignoniaceous vines characterize it. Mounted sheets exhibited (from Dr. Rusby's collecting) included *Spondias*, the hog-plum, *Anona*, the custard-apple, palms of the genus *Bactris*, and representatives of the many large trees (exceeding often 100 feet high), as a *Vitex* of the *Verbena* family and an *Aliberta* of the *Rubia* family ; also a *Paullinia*, a woody vine and a *Cupania*, both of the Sapindaceae, etc.

2. A river flora, including a marginal flora on submerged banks and a submerged flora upon islands : chiefly a mass of tangled vines. River bank trees of which specimens were shown included a *Cecropia* of the fig family, and *Inga*, a relative of the acacia, a tree which becomes a mass of flowers frequented by hundreds of humming-birds. Another tree, *Hecastophyllum*, has its hollow stems inhabited by myriads of stinging ants. Shrubs of the marginal flora include many with a milky juice, as *Tabernaemontana*, and many gorgeous-blooming species of *Solanum*. Woody vines were largely of the Bignoniaceae ; drinkable water was obtained from the stem of one which climbed perhaps 100 feet. Marginal river herbs shown included a *Spigelia*, source of a valuable drug, especially important now that the *Spigelia* of the southern United States is disappearing. A *Cuphea* with orange flowers made a magnificent display. A *Heliconia* (*H. pendula*) of the Zingiberaceae, resembles a drooping orchid. *Sphenoclea*, an introduced member of the *Lobelia* family from India, covered low places. Island trees include several large drupe-bearing species of *Moquilea* and *Licania*, related to our plum, and producing a wood valued there for charcoal-making.

3. Along the setbacks of high-water periods, lakes remain as the water recedes, alternating with partly dried exposed levels, which produce peculiarly dense and formidable swamps. The

lakes become covered with vegetation which resembles a meadow at a distance. This swamp flora includes floating and herbaceous aquatics and shrubby thickets like chaparral. Trees occur with roots nearly exposed during the dry season.

The swamp flora includes many trees of the *Rubia* family, with valuable wood; a profusion of shrubby *Lantana* and *Eupatorium;* various vines, as the *Securidaca* of the *Polygala* family; herbs, as *Jussiaea* of the Onagraceae, etc.

4. A tidal flora extends some forty miles in breadth along the coast, with villages built on piles. The littoral flora at the ocean edge is soon replaced by an inland tidal flora, largely of stout fan-leaved palms, of different species from the short spiny palms of the river margins or the tall smooth palms of the hills.

Dr. Rusby found but few orchids; two exhibited were a beautiful *Ionopsis* and a *Habenaria* of curious floating habit, growing over deep water. One of the palms occurring there is remarkable for its elevated base, raised about four feet by means of spiny outward stilts (roots?), its smooth trunk rising upward about forty feet.

In answer to inquiries, Dr. Rusby said that his collections were made during six weeks beginning in April; that though he found many flowers, he concluded that flowering and seed production at any time is comparatively the exception in the tropics, nature relying chiefly on the continuance of plants by vegetative processes. Much of the country visited was uninhabited; the Imataca mountains, about twenty-five miles distant, had never, it would seem, been visited by the Indians of the region. Dr. Rusby attempted to reach them, but in vain, making but nine miles in three weeks.

Two members of the party afterwards reached these mountains, and were rewarded by the discovery of a "lace-work fall" hundreds of feet in height but falling from inaccessible cliffs.

The evening's program closed with the exhibition by Dr. Underwood of a sterile mycelium of a fungus of the nature of a *Polyporus,* growing recently beneath the new North German Lloyd docks.

EDWARD S. BURGESS,
Secretary.

Meeting of January 13, 1903

This, the annual meeting, was held at the College of Pharmacy; seventeen present; Dr. H. H. Rusby in the chair.

The minutes for December 9 were read and approved. The announced meeting of December 31 was reported adjourned.

Election to active membership included three: Mr. Marshall H. Bright, Tarrytown, N. Y.; Mr. L. C. LeRoy, 6 Lexington Ave., New York City; Miss Mary M. Brackett, 640 West 115th St., New York City.

Annual reports of officers were made as follows:

By the treasurer, Professor F. E. Lloyd, reporting a balance in the treasury.

By the recording secretary, Professor E. S. Burgess, presenting the bound volume of minutes for the year 1902, and reporting a present active membership of 238, and total membership of 384; 17 meetings during the year with average attendance of 19; 34 papers presented, besides about 33 minor communications or brief notes.

By the corresponding secretary, Dr. J. K. Small, reporting attendance upon the foreign correspondence of the Club.

By the editor-in-chief, Dr. L. M. Underwood, reporting 1902 as the Club's most productive year of publication, both as regards text and plates, with a total 1,761 octavo pages and 90 plates. This was partly in consequence of the number of Memoirs printed, two intended for 1901 having been delayed till 1902.

By the editor of Torreya, Dr. M. A. Howe, reporting a favorable increase in the subscriptions outside the club membership.

By Dr. N. L. Britton, chairman of the committee on local flora, calling attention to the need of the prosecution of local studies.

By Dr. L. M. Underwood, chairman of the committee on the Cryptogamia, reporting the local value of Dr. Tracy E. Hazen's recent monograph on the Chaetophoraceae and Ulothricaceae, based very largely on material collected in or near New York City. The local fleshy fungi have been extensively collected during the past year by Professor F. S. Earle, including some 1,400 numbers.

The report of the chairman of the field committee, Dr. Schoe-

ney, was deferred on account of his illness. The need of more help in supplying guides was presented by Mr. Eugene Smith.

The following special committees were appointed:

An auditing committee, to consider the accounts of the treasurer, consisting of Dr. Britton and Dr. Small.

A committee of ways and means to promote the usefulness of the Club by increase of membership in the city and among non-resident botanists, and to increase the subscription list of our three publications. On motion of Dr. Underwood, the editor, treasurer, recording secretary, and the two vice-presidents were appointed as this committee.

The session was closed by the annual election. Several changes in the official board were made necessary by the death of vice-president Allen, the departure of the editor, Dr. Underwood, on his sabbatical leave, and the resignation of the secretary, E. S. Burgess, on account of pressure of work. The following officers were elected: *President*, Hon. Addison Brown; *Vice-Presidents*, Dr. H. H. Rusby, Professor E. S. Burgess; *Treasurer*, Professor F. E. Lloyd; *Recording Secretary*, Professor F. S. Earle; *Corresponding Secretary*, Dr. J. K. Small; *Editor*, Dr. John H. Barnhart; *Associate Editors*, Dr. N. L. Britton, Dr. T. E. Hazen, Dr. M. A. Howe, Dr. D. T. MacDougal, Dr. W. A. Murrill, Dr. H. M. Richards, Miss Anna Murray Vail.

Adjournment followed upon this election.

EDWARD S. BURGESS,
Secretary.

CORRESPONDENCE

The *Connecticut Botanical Society* was organized in New Haven, January 24, 1903, with an initial membership of thirty-one ladies and gentlemen interested in the flora of the State.

The officers of the Society are: *President*, Professor A. W. Evans; *Vice-President*, Dr. C. B. Graves; *Recording Secretary* and *Treasurer*, Dr. E. H. Eames; *Corresponding Secretary*, Mr. E. B. Harger, Oxford, Conn.

Mr. Harger read an interesting paper on "November Wild Flowers," followed at the afternoon session, by Mr. M. L. Fernald, "On the Geographic Distribution of certain New England Plants," which was carefully illustrated by numerous herbarium specimens, and a paper by Mr. W. E. Britton, "Notes on the Flora of the North Haven Plains," which was aided by photographs.

A work undertaken by this Society is the preparation of an accurate list of the flora of the State, to accomplish which, in part, a committee on phaenogamous and vascular-cryptogamous plants was appointed. Another committee, for work upon the lower cryptogams, will be announced later.

The former committee consists of Dr. C. B. Graves, New London; Dr. E. H. Eames, Bridgeport; Mr. C. H. Bissell, Southington; Mr. L. Andrews, Southington; Mr. E. B. Harger, Oxford; and Mr. J. N. Bishop, Plainville.

The preparation of the flora would be made less difficult, if all who can supply specimens and information of value, will assist the committee as much as possible. To this end any member may be addressed, with the assurance that full credit will be given for all available material, together with the thanks of the Society, and of all who are interested.

E. H. Eames, M.D.,
Secretary.

Bridgeport, Connecticut,
February 1, 1903.

NEWS ITEMS

Volume 2 of the Memoirs of the New York Botanical Garden, consisting of a monograph on "The Influence of Light and Darkness upon Growth and Development" by Dr. D. T. MacDougal, was issued on January 20. It is expected that a review notice of this work will appear in the March number of Torreya.

"Additional Observations on the Strand Flora of New Jersey," is the title of a paper by Dr. John W. Harshberger, of the University of Pennsylvania, issued in December from the Proceedings of the Academy of Natural Sciences of Philadelphia. This is supplementary to the author's "Ecological Study of the New Jersey Strand Flora," published in 1900.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 28, published in 1901, contained 706 pages of text and 49 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–28 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–27 (1882–1900) are furnished at the published price of two dollars each; Vol. 28, three dollars.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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Matter for publication should be addressed to

MARSHALL A. HOWE
New York Botanical Garden
Bronx Park, New York City

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TORREYA

March, 1903

VITAL PERSISTENCY OF AGAVE AMERICANA

By S. B. Parish

In the autumn of 1890 Mr. George S. Myers, of Riverside, California, planted on his grounds a young *Agave Americana*. By 1900 it had become so inconveniently large that its removal

Fig. 1. *Agave Americana.*

was desirable, and in March, its leaves having first been sawed off, it was dug up, and, by the aid of a horse, drawn aside, where it was left to become dry and be burned. The next spring it

[Vol. 3, No. 2, of Torreya, comprising pages 17–32, was issued February 19, 1903.]

was still living, but the fibrous roots were dry, and were scorched off with the assistance of some rubbish. The trunk itself showed no noticeable shrinkage or desiccation.

In May, 1902, it was observed to be putting forth a flowering scape. The plant had now lain for two years on the dry ground without any radical connection with it, and, consequently, without receiving any nutriment or water. The growth of the scape was rapid, averaging in its early period six inches a day. As the trunk lay on its side the scape necessarily turned upwards at right angles, and it was maintained in an upright position by means of guy wires. Eventually it attained a height of about fifteen feet, flowered freely and produced fruit. The illustration is from a photograph taken August 15, 1902.

In November, of the same year, the energy of the plant being still unexhausted, it produced three small scapes from near the base of the crown, the largest of which was about eighteen inches high. These also flowered.

Mr. E. A. Zumbro, of the Riverside High School, informs me that, in another case, he knew of an agave which flowered after it had been dug up and had lain on hard ground "a long time."

It is frequently the custom here in California, as an agave grows large, to keep all but its uppermost leaves pruned off; and such plants flower vigorously. The nutriment which agaves store up preparatory to inflorescence is deposited mainly in the crown and in the leaf-bases, so that the removal of the leaves themselves affects the plant only to a limited degree. The drying of the sap on the cut surfaces seems to seal them up so as to prevent much evaporation.

For the greatest part, it is upon this accumulated nutriment that an agave draws for the rapid development that characterizes its reproductive period. The supplies directly contributed by the root system at this time must be comparatively insignificant. We are not surprised at seeing agaves flowering freely in the sterile and arid soil of the deserts, where, at the time, their roots can find little, if any, moisture — must, in fact, serve mainly as mere holdfasts.

It is but a step further to find a plant accomplishing its repro-

ductive function after it has been deprived of roots. Why, in the present case, it did not do this in the first year, rather than in the second, is not clear. Evidently its vigor and resources must have been greater then; for there could have been no gain, and there must have been some loss. Perhaps it was that unexplained force which sometimes causes a starved and dying plant to throw all its remaining strength into a final effort for the perpetuation of its species.

The production of secondary, and quasi-lateral, inflorescences is not uncommon in agaves, both in cultivation and when growing wild. As is well understood, they are produced by offsets, either developed or latent.

San Bernardino, California,
December 20, 1902.

A KEY TO THE NORTH AMERICAN SPECIES OF LENTINUS — I

By F. S. Earle

The genus *Lentinus* was founded by Fries in 1825.* From the first it has been an incongruous aggregate consisting of several groups of quite diverse species which agree only in a certain toughness of texture. In outlining the original generic characters, Fries says the lamellae are concrete with the pileus, while in *Agaricus* he says they are discrete. This character, however, is shared with *Panus*, which thus seems to differ only in being still firmer in texture. Many species of *Lentinus* have the lamellae more or less lacerate or dentate on the margin, but, from the first, species have been included in the genus without this character.

The genus is now usually divided into the seven following sections:

Key to the Sections of Lentinus

1. Stipe central or excentric; pileus entire.	2. (*Mesopodes*)
Stipe lateral or wanting; pileus dimidiate.	Pleuroti.
Stipe wanting; pileus resupinate.	Resupinati.

* Syst. Orb. Veg. 77. 1825.

2. Pileus hairy or strigose.	CRINITI.
Pileus scaly.	LEPIDEI.
Pileus pulverulent.	PULVERULENTI (see *Criniti* in following keys).
Pileus glabrous, lobed, unequal.	COCHLEATI.
Pileus glabrous, regular.	CORNUCOPIOIDES.

There are some reasons for considering the *Criniti* as the typical section of the genus and when it comes to be divided, as it doubtless will be, the name should probably be retained for this section, which constitutes a very homogeneous group of mostly tropical species. They are all thin, deeply depressed to infundibuliform and have a conspicuous hairy vestiture. The *Pulverulenti* agree closely with this section and so far as the North American species are concerned should be united with it as has been done in the following keys. These species differ only in a somewhat shorter vestiture, but they are distinctly velvety with close short hairs, not truly pulverulent.

The *Lepidei* constitute another homogeneous group having little in common with the *Criniti*. In these the pileus is thick and fleshy though firm and rather tough and the shape is convex rather than depressed but usually with the center umbilicate. The surface of the pileus usually breaks into more or less conspicuous innate scales. In the young state there is a distinct cortina covering the lamellae but this disappears without leaving an annulus on the stem.

The *Cochleati* are many of them densely cespitose. They are comparable to the cespitose section of *Clitocybe*. Neither this section nor the *Cornucopioides* are well defined homogeneous groups like the other two. The species now assigned to the *Pleuroti* and *Resupinati* will probably ultimately be assigned to *Pleurotus* and *Panus*, where they seem to be more closely related than to the other well-defined groups of *Lentinus*.

KEY TO THE SPECIES OF LENTINUS

Section CRINITI (including PULVERULENTI)

1. Pileus regular; stipe central.	2.
Pileus irregular; stipe often excentric.	26.
2. Pileus strigose or villous or the margin ciliate.	3.
Pileus velvety (Pulverulenti).	25.
3. Hairs of the pileus free, not fascicled.	4.
Hairs of the pileus more or less fascicled.	13.

4. Pileus villous, hairs mostly soft and appressed. 5.
Pileus strigose or setose, often erect, or some scale-like. 9.

5. Pileus infundibuliform; stipe mealy, or floccose-scaly. 6.
Pileus umbilicate or depressed; stipe fibrillose or velvety. 7.

6. Pileus dark reddish-brown; stipe slightly mealy. *L. crinitus* (L.) Fr.
Pileus pale cervinous; stipe floccose-scaly. *L. subcervinus* B. & C.

7. Stipe velvety; pileus becoming glabrate, margin ciliate. *L. blepharodes* B. & C.
Stipe fibrillose; hairs of the pileus persistent. 8.

8. Lamellae pallid; stipe white. *L. Wrightii* B. & C.
Lamellae white; stipe brown. *L. villosus* Klotzsch*

9. Pileus deeply infundibuliform. 10.
Pileus only depressed or umbilicate. 11.

10. Pileus with disc glabrate; stipe spotted. *L. chaetoloma* Fr.
Pileus with the disk minutely scaly; stipe hispid. *L. strigellus* Berk.

11. Stipe subvillous, apex black-punctate, cervinous. *L. stupens* Klotzsch†
Stipe subsquamulose. 12.

12. Stipe white; pileus 4 cm., deeply umbilicate. *L. rigidulus* B. & C.
Stipe brownish-yellow; pileus 12 mm., subglobose. *L. Schweinitzii* Fr.

13. Stipe glabrate to furfuraceous-squamulose. 14.
Stipe strigose, villous or velvety. 19.

14. Pileus convex, yellow, the disc furfuraceous-velvety. *L. chrysopeplus* B. & C.
Pileus infundibuliform. 15.

15. Stipe nearly black; margin of pileus strongly revolute. *L. nigripes* Fr.
Stipe nearly black; margin of pileus not revolute. *L. Leveillei* Berk.
Stipe subconcolorous or paler. 16.

16. Pileus cervinous, with soft appressed hairs, disc becoming glabrate. 17.
Pileus much paler, pilose-tomentose; stipe glabrous. *L. Swartzii* Berk.

17. Lamellae pallid, not anastomosing; stipe subglabrous. *L. tener* Klotzsch
Lamellae pale cervinous, anastomosing behind; stipe furfuraceous. 18.

18. Lamellae not glandular. *L. Schomburgkii* Berk.
Lamellae glandular, punctate. *L. Schomburgkii* var. Berk.

19. Pileus infundibuliform. 20.
Pileus umbilicate or depressed. 22.

20. Pileus large, 18–24 cm. *L. Sullivantii* Mont.
Pileus smaller, 4–8 cm. 21.

21. Lamellae reddish, velvety next the stipe. *L. caelopus* Lév.
Lamellae pallid, glabrous, entire. *L. Nepalensis* Berk.

* The type of this species was from the island of Mauritius, east of Madagascar. It is doubtful if it occurs in this hemisphere, though much material from tropical America has been referred to it.

† This species also is from Mauritius and is very doubtfully American.

22. Pileus with hairs in stalked pyramidal fascicles. *L. pyramidatus* B. & C.
Pileus not as above. 23.

23. Pileus orange, hairs of two kinds, lanate and rigid. *L. siparius* B. & C.
Pileus cervinous, strigose; stipe farinose above. *L. Nicaraguensis* B. & C.
Pileus fuscous or fulvous. 24.

24. Pileus small (1.25 cm.), membranous-coriaceous, totally covered with short deciduous fascicled hairs. *L. Leprieurii* Mont.
Pileus 3 cm., fascicles of hairs toward the center, scattered and depressed. *L. sparsibarbis* B. & C.

25. Stipe thick, tapering downward, 4–5 cm. × 5–10 mm. *L. castaneus* Ell. & McB.
Stipe elongated, cylindrical, radicating, reaching 15 cm. × 3–5 mm. *L. velutinus* Fr.

26. Very large; pileus 15 cm., white, fulvous when dry. *L. vellereus* B. & C.
Smaller; pileus 2–6 cm., purplish, then reddish-brown. *L. strigosus* (Schw.) Fr. (= *L. Lecomtei* Fr.).

THE PUBESCENCE OF SPECIES OF ASTRAGALUS

By Francis Ramaley

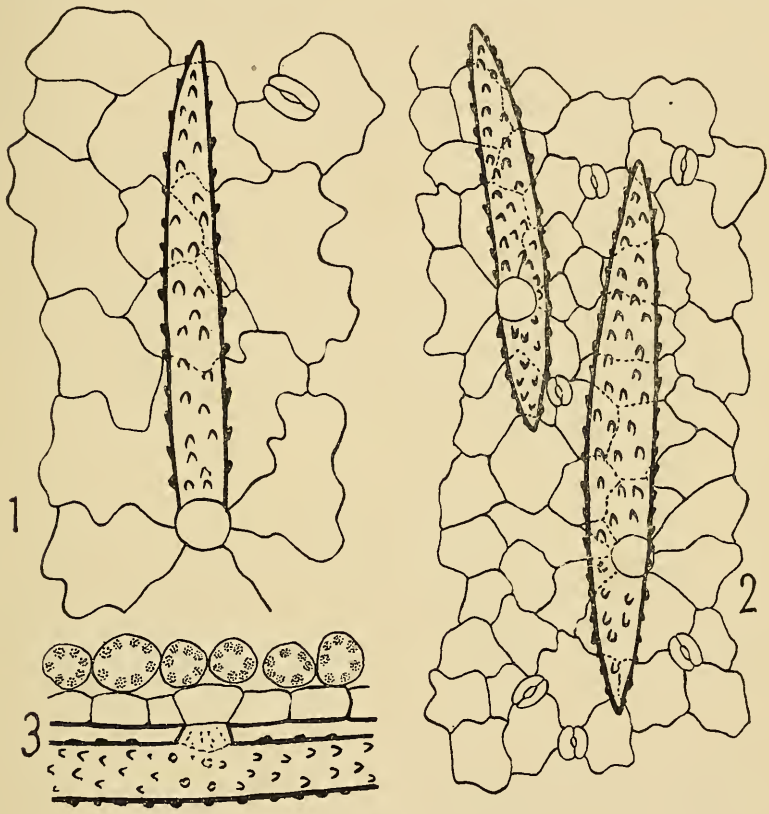
While making a study of leaf anatomy in the genus *Astragalus*, a difference was noted in the character of the trichomes in the different species. There are two kinds of hairs. Both are straight and simple with small basal cell and elongated end cell. In one kind of hair the end cell is straight and tapers to the point. The basal portion is the thickest part of the cell. This is shown in Fig. 1, which is a surface view of the lower epidermis of *Astragalus racemosus* Pursh. In the other kind of hair, the end cell is pointed cigar-shaped and attached some distance from one of the ends. Fig. 2 shows the appearance of these hairs in surface view of the lower epidermis of *A. Carolinianus* L. The mode of attachment will be recognized in Fig. 3, which is from a vertical section of the leaf of the same species. These cigar-shaped, double-pointed hairs are recorded for *Astragalus* by Solereder,[1] but no figure is given in his work. He calls them "two-armed" hairs.

Specimens of eight species were examined by the writer. In each of these eight, so far as might be judged from the material

[1] Syst. Anat. Dicotyledonen, 305. 1899.

studied, only one kind of trichomes was present. Care was taken to examine specimens of each species collected in various localities.

It is quite likely that there are species in which the hairs are more or less intermediate in form between the two kinds here



FIGS. 1–3. Hairs of *Astragalus*.

described. In fact in *A. Carolinianus* some of the hairs have the short "arm" quite short, so that instead of being nearly the length of the longer arm, it is only about one sixth of the length. The hairs shown in Fig. 2 are of about average form for the species.

Since the two kinds of hairs seem to be characteristic for the particular species, it is possible they could be made use of by systematists. The great difficulty of the genus *Astragalus* is

well known and these additional characters might serve to render identification easier. For simple identification of the kind of hair, it is not necessary to make thin sections of the leaf. An entire leaflet, taken from an herbarium specimen, may be placed on a slide and examined dry by reflected light, using the low power of the compound microscope.

Of the species examined, the following have the single-armed hairs: *Astragalus Drummondii* Dougl., *A. alpinus* L., *A. Bigelovii* A. Gray, *A. crassicarpus* Nutt., *A. flexuosus* (Hook.) Dougl., *A. Hypoglottis* L., *A. junciformis* A. Nelson, *A. racemosus* Pursh. Of these the first three have hairs somewhat longer than the rest and longer than those of *A. racemosus* shown in Fig. 1. Only two of the species examined have the double-pointed hairs. These are *Astragalus adsurgens* Pall. and *A. Carolinianus* L.

The purpose of this note is merely to call attention to these trichomes in the hope that systematists may find them useful.

University of Colorado,
Boulder, Colo.

SHORTER NOTES

Insect Visitors of Scrophularia. — With reference to Mr. E. W. Berry's notes (Torreya, 3 : 8), it may be said that *Scrophularia* is freely visited in Europe and America by short-tongued bees. On Ruidoso Creek, New Mexico, Professor E. O. Wooton found a *Scrophularia* (I suppose *S. montana*, Wooton) to be freely visited by three species of the bee-genus *Prosopsis*, which I described as *P. Wootoni*, *P. tridentula* and *P. Rudbeckiæ* race *Ruidosensis*. C. Robertson (Trans. St. Louis Acad. 5 : 587) cites numerous species of bees, long- and short-tongued, from *Scrophularia* in Illinois. Knuth (Blütenbiologie, 2^2 : 142 ff) gives a summary of the European records.

T. D. A. Cockerell.

East Las Vegas, New Mexico.

Some interesting Hepaticae from Maine. — In a collection representing fifteen genera and twenty-one species made in the vicinity of Prospect Harbor, Maine, by Mrs. Alice R. Northrop

and studied by the writer with the assistance of Dr. M. A. Howe and Dr. A. W. Evans, *Cephalozia Francisci* (Hook.) Dumort. is recognized for the first time as an American species. *Cephalozia Francisci* is somewhat rare in Europe, though it has been found in England, Ireland, France, Denmark and Germany. Various botanists have mentioned and described it, Sir W. J. Hooker being the original describer under the name of *Jungermannia Francisci* in his British Jungermanniae, *pl. 49*. His full description and figures agree with our specimen except in regard to the perianth, which he says is "evidently toothed," ours being simply repand as Spruce later described it in his work on *Cephalozia* (p. 49). The perianths in our specimen agree well with those of two specimens from the Rheinprovinz in the herbarium of the New York Botanical Garden. In Europe the species is said to be "in fruit," gemmiparous also, in spring and early summer; here, at this Maine station, it bears gemmae, immature androecia, and perianths with immature sporogonia, in August. This locality in Maine proved also a new station for *Frullania Tamarisci* (L.) Dumort., which is rare in this country; and *Scapania curta* (Mart.) Dumort., also, was found growing there with *Riccardia latifrons* Lindb. and *Cephalozia lunulaefolia* Dumort., evincing the same choice of associates as when found a few years ago on the other side of the continent, at Sisson, Siskiyou Co., California, by Dr. Howe.

Caroline Coventry Haynes.

16 East 36th Street,
New York City.

REVIEWS

The Influence of Light and Darkness upon Growth and Development *

So incomplete and contradictory conclusions have been obtained upon this subject by various authors since the time of John Ray, 1686, that it is fortunate that this question has been at last taken up in a systematic and comprehensive manner. In the present memoir, Doctor MacDougal has presented an exceptionally important contribution to science. The work is a model of its kind not only in the scope of the undertaking, but in the

* MacDougal, D. T. The Influence of Light and Darkness upon Growth and Development. Mem. N. Y. Bot. Garden 2 : i–xiii + 1–319. *f. 1–176*. 20 Ja. 1903.

manner and form of presentation. A review of the more important investigations and conclusions that have been reached by various authors prefaces the observations. During the seven years in which the work was prosecuted, ninety-seven species of plants were cultivated in continuous darkness with controls in ordinary alternation of daylight and darkness. Plants illustrating a wide range of habit and habitat were utilized, embracing aquatics, creepers, climbers, succulents, mycorhizal forms and fungi, geophilous and aërial shoots, mesophytes and xerophytes. These were grown from tubers, corms, rhizomes, cuttings of leaves and stems, seeds and spores. A full account of the conditions of experimentation and results obtained with each of these plants is given, together with 176 cuts illustrating the morphological and histological variations. The concluding portion of the volume is devoted to a general consideration and interpretation of the results obtained, and deals with the effect of light and darkness upon the various organs and tissues, the nature of etiolation, the relation of light and darkness to growth and differentiation, the stimulative influence of light, and the influence of etiolation upon chemical composition. An excellent index enhances the value of the book.

Of the many important features that should be mentioned the limits of this review permit the presentation of only a few. A wide variation is to be seen in the amount of growth or increase in volume, and in the differentiation of the tissues and organs of the etiolated plant. It is interesting to note that in many species the total length, diameter and volume of the etiolated shoot and its organs are not so great as in the case of the plant grown under normal conditions. So also in regard to the differentiation of the tissues, no generalizations can be made owing to the diversified conditions found. In a general way it can be said that the degree of differentiation of the tissues is less marked in etiolated forms, and that primary and embryonic tissues, especially parenchyma, are subject to continued cell formation and growth. To these tissues more especially is the growth and increase in volume due. The abnormal development of this fundamental tissue doubtless also accounts for the commonly observed torsion

and twisting of etiolated parts, since the activity of these cells results in a displacement of the mechanical tissues.

Perhaps the most important result reached by the author is the demonstration of the absence of a paratonic action of light on growth. The failure of a large proportion of the plants to manifest an increased growth in darkness can only be interpreted as demonstrating that there is no invariable relation existing between light and increase in length and thickness or between the division and increase in volume of the cell. On the other hand those forms exhibiting a marked acceleration in growth when removed from the light show adaptional elongations that can be explained by the stimulative action of darkness rather than by the retarding action of light. The views of Sachs on this subject and on the morphological significance of climbing plants and in fact the entire views of his school on the relation of light and darkness to growth and development fall to the ground as a result of the evidence here brought forward. Several other widely accepted views become untenable in the light of these extended and accurately performed experiments. The attempt by Kraus to explain the atrophy or meager development of leaves on the basis of a lack of nutrition is seen to be futile when wider observations reveal the fact that often the development in darkness may equal or exceed the normal growth. So also the belief, generally accepted since the time of Boehm and Godlewsky, that the elongations manifested in etiolated plants are adaptive reactions to lift the photosynthetic parts into the light is overthrown by the results that were obtained in many instances where these organs either failed to show any response that could possibly be interpreted as adaptive or on the other hand were clearly the reverse of beneficial. The main conclusions of the author may be summed up in these words: Darkness deprives the plant of the determinative and morphogenic influence of light and consequently the embryonic tissues are chiefly developed while the secondary tissues that appear in the plant body, in the formation of the flower, maturation of the fruit, etc., are poorly differentiated. The growth, consequently, of the etiolated plant is due to the stimulus of darkness and entirely controlled by its autotropic and geotropic reflexes. CARLTON C. CURTIS.

PROCEEDINGS OF THE CLUB

Wednesday, January 28, 1903

The meeting was held at the New York Botanical Garden; twenty members present; Dr. Britton in the chair.

The resignations of Mr. John J. Schoonhoven and Miss Rachel W. Farrington were accepted. By vote of the Club, Miss Farrington was placed on the list of corresponding members. The scientific program was then taken up.

The first paper was by Mr. R. S. Williams, entitled "Some Economic Plants of Bolivia." He stated that there are great extremes in temperature in Bolivia, frost occurring in the higher elevations for ten months of the year. Many grasses are found at these elevations. The chief crops for the high lands are barley, wheat, potatoes and *quinoa*, the seeds of a species of the Chenopodiaceae. Many varieties of corn are raised up to 5,000 to 6,000 ft. Beans of many kinds are also grown. Rice is the principal grain in the tropical regions. Sugar cane grows up to 4,000 ft. and there are large fields of it everywhere. It is crushed by passing the stalks back and forth between rollers turned by oxen. The fruits of the lower country are lemons, oranges, bananas, *papaya*, *cherrimoya*, *granadilla* and others. A species of sorrel, *Oxalis tuberosa*, is largely cultivated. The tubers are eaten as a vegetable. Tomatoes are raised, but they are poor and small. Peppers are in great variety, and are much used. Coffee is grown up to 5,000 ft. A fine quality is produced but distance from market prevents its export. There are no wild fruits or nuts of value in the region visited.

The people of the higher regions, the Aymara, live principally on meat. They are larger and darker-colored than the lowland tribes, the Quitchua, and are different in habits.

The paper was discussed by Dr. Britton, Professor Selby and others.

The second paper was by F. S. Earle entitled "Remarks on the Fungus Flora of Jamaica." He gave a brief account of the topography and climate of the island. There have been some

five or six papers on Jamaica fungi, beginning with Patrick Browne in 1755, but the total number known from the island is so far less than a hundred species. About five hundred numbers were taken by the speaker during his recent visit to the island. Of these nearly one half belonged to the Polyporaceae. About one hundred were Agaricaceae, over thirty Thelephoraceae, but only three Hydnaceae. Of the Pyrenomycetes over one half belonged to the Xylariaceae. Of rusts (Uredinales) there were only twelve. Quite unexpectedly, the conidial stages of the powdery mildews (Erysiphaceae) were fairly abundant, but in no case were perithecia found.

As a rule, fungi are more abundant at the lower elevations and in the drier parts of the island. In the moist mountain woods where the conditions are most favorable for the growth of ferns, fungi are not abundant. Some saprophytes were found in such locations but parasites were almost entirely absent.

Mr. Nash exhibited a living flowering specimen of a new species of *Pitcairnia* collected by Dr. Britton in St. Kitts. Among its more prominent characters were the absence of spines and the conspicuous whitening of the under side of the leaves.

Dr. Britton described the finding of this plant at the summit of Mt. Misery, on the rim of an extinct crater. It was growing in a deep carpet of moss and was associated with other bromeliads including *Pitcairnia alta*, a spiny species, and an undescribed *Tillandsia*.

Dr. Howe was now called to the chair and Dr. Britton presented the following resolutions on the recent death of Dr. Timothy F. Allen:

Resolved, That in the death of Dr. Timothy F. Allen, for many years one of its Vice-Presidents, and one of its original incorporators, the Torrey Botanical Club and the science of botany have experienced a serious loss.

Resolved, That the sincere sympathy of the Club be and is hereby extended to the family of Dr. Allen.

Resolved, That a copy of these resolutions be spread upon the minutes of the Club, and that they be printed in TORREYA.

The above resolutions were accepted and adopted.

F. S. EARLE,
Secretary.

TUESDAY, FEBRUARY 10, 1903

The meeting was held at the College of Pharmacy; in the absence of the President and Vice-Presidents, Dr. Lighthipe was called to the chair; sixteen members were present.

The following persons were elected as active members:

Dr. J. C. Arthur, Lafayette, Ind.

Professor Melville T. Cooke, Greencastle, Ind.

Mrs. Elizabeth B. Davenport, Brattleboro, Vt.

The paper of the evening was by Mr. Eugene Smith, entitled "Remarks on Aquatic Plants."

The speaker exhibited a number of specimens of marsh and aquatic plants. The distinction between the two is not sharply drawn, but the true aquatics pass their entire life under water or at most produce only their flowers and fruit at the surface. The flowers of true aquatics are never showy. Marsh and aquatic vegetation includes many diverse elements from a systematic standpoint, including representatives from the lowest to the highest families. Algae are of course almost exclusively aquatic and constitute a great part of the underwater vegetation. The bryophytes are represented by many species, some of which are truly aquatic. The pteridophytes have a few aquatic and semi-aquatic members. The Naiadaceae and Valisneriaceae are the most important families of flowering plants that are wholly aquatic. Many others include aquatic species, but they become fewer in the Gamopetalae.

Few species of flowering plants are able to live in brackish or salt water. Methods of pollination are often interesting, as in *Valisneria*, where the staminate spathes are on short stalks near the bottom and at maturity break away, carrying the pollen to the surface, where the pistillate spathes are borne on long peduncles. These after pollination coil up so that the fruits ripen near the bottom. With water plants that have both submerged and floating leaves there is usually a marked difference of form between the two. The tissues of aquatics are usually soft and flaccid. The plants being supported by the water do not need to develop hard woody tissues for mechanical support.

In the neighborhood of a body of water four categories of

plants can usually be distinguished, though the dividing lines are often not sharply drawn. These are, first, the swamp or marsh plants that are only partly submerged. Second, those that root in the bottom but with floating leaves. Third, those that are attached to the bottom but live wholly submerged and fourth, those that are free, either floating or submerged. The last group includes the vegetable part of the plankton.

The study of aquatic plants has been much neglected. The waters of tropical regions in particular afford almost a new field for exploration and study.

The paper was discussed by Dr. Howe, Dr. Barnhart and various other members.

F. S. Earle,
Secretary.

NEWS ITEMS

We learn from *Science* that Professor Bruce Fink, of the Upper Iowa University, has accepted the chair of botany at Iowa College and will assume his new duties in September.

Mr. J. Burtt Davy, recently of the University of California, has been appointed state agrostologist and botanist of the Transvaal. He sailed for South Africa from New York on March 10, going by way of England.

Mr. A. A. Heller, who returned a few weeks ago from his third botanical expedition to Porto Rico, has now gone to California. Pacific Grove, Monterey County, will be the base for his collecting operations for a time.

Dr. and Mrs. N. L. Britton, of the New York Botanical Garden, and Mr. J. A. Shafer, custodian of the herbarium of the Carnegie Museum at Pittsburg, left New York on March 5 for Havana. They plan to devote a few weeks to botanical collecting in Cuba.

Professor F. S. Earle, of the New York Botanical Garden, and Mr. E. W. D. Holway, of Decorah, Iowa, sailed from New York on February 26, for Santiago, Cuba, where they were expecting to meet Professor Underwood, who has been for some weeks in Jamaica. The party intends to spend several weeks in making collections and field studies in eastern Cuba.

Professor A. D. Selby, botanist of the Ohio Agricultural Experiment Station, who has been in residence at the New York Botanical Garden since November, has been granted a research scholarship by the Garden for the continuation of his studies in the chemical physiology of plants.

We are informed that the library of the late well-known botanist, Alexis Jordan, of Lyon (1814–1897), will be offered at auction next May. This is said to be one of the largest private botanical libraries in Europe. Paul Klincksieck, 3 rue Corneille, in Paris, is preparing a catalogue of this library, which will be sent free to applicants.

Dr. D. T. MacDougal, who, with Mr. Frederick V. Coville, of the Bureau of Plant Industry, has been serving in an advisory capacity in relation to the proposed desert botanical laboratory of the Carnegie Institution, returned to New York on February 28, after five weeks spent in visiting portions of New Mexico, Arizona, northern Mexico, and southern California.

Visiting botanists in New York since December 15, 1902, include Mr. Henri Hus of the University of Amsterdam, Mr. A. F. Blakeslee of Harvard University, Professors L. R. Jones and William Stuart of the University of Vermont, Professor Alexander W. Evans of Yale University, Mr. John C. Willis, Director of the Royal Botanic Gardens at Peradeniya, Ceylon, Dr. William Dayton Merrell, of the University of Rochester, Mr. Clifton D. Howe, of the University of Chicago, Mr. E. W. D. Holway, Decorah, Iowa, and Mr. J. A. Shafer, of the Carnegie Museum.

The announcements of the Marine Biological Laboratory, at Wood's Holl, Mass., of the Ohio State University Lake Laboratory, at Sandusky, Ohio, and of the Harpswell Laboratory of Tufts College, at South Harpswell, Maine, for the summer of 1903, have been distributed. The department of botany of the Wood's Holl Laboratory remains under the direction of Professor Bradley Moore Davis, of the University of Chicago; that of the Sandusky Laboratory is in charge of Professor W. A. Kellerman. Professor J. S. Kingsley, of Tufts College, is the director of the Harpswell Laboratory.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–28 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–27 (1882–1900) are furnished at the published price of two dollars each; Vols. 28 and 29, three dollars each.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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Vol. 3 No. 4

TORREYA

April, 1903

NOTES UPON THE ORCHIDS OF CENTRAL NEW YORK

By Homer D. House

Central New York, and especially Onondaga County, has been frequently commented upon for its many species of ferns. A comparison of the orchid flora of the same region with that given in various local floras of the state, makes evident the fact that central New York has not only a rich fern flora but possesses also a large and varied orchid flora. In individuals the orchids are not so abundant as the ferns, but the number of species reported from this region is equal to, or larger than, that of any other section of New York. Paine, in the Flora of Oneida County, 1864, recorded forty-one species for all of New York west of Albany. Clute records twenty-nine species for the Susquehanna region; Dudley, thirty-five species in the Cayuga Lake region. Beckwith and Macauley cite forty-one species from western New York. From these figures it is seen that the orchids appear to be more abundant as regards species in the northern and western parts of the state. For the purposes of this article, the region known as central New York may be limited to that part of the state north of the Susquehanna divide in the counties of Onondaga, Madison and Oneida, also including portions of Oswego and Herkimer counties. This area would have Little Falls on the extreme east and have its western limits a few miles west of Syracuse.

The names included herein are in most cases based upon accessible herbarium specimens. Of such specimens, most of those in the herbarium of Columbia University were collected by Pro-

[Vol. 3, No. 3, of Torreya, comprising pages 33–48, was issued March 20, 1903.]

fessor Underwood and Rev. W. M. Beauchamp. A lesser number is represented in the herbaria of Syracuse University and of the New York Botanical Garden. There are recorded for this region as defined above, forty-five species and two varieties, one of the latter being new.

Cypripedium L.

C. arietinum R. Br. Very rare. Clay swamp, Onondaga Co., *Mrs. M. O. Rust*, 1883. Reported by Paine from southern Herkimer County; and near Oneida Lake according to Asa Gray.

C. acaule Ait. Common. Most abundant in the sandy pine woods of the lower elevations, and especially about Oneida Lake and in Oneida County.

C. reginae Walt. Common in sphagnum bogs and in swamps, in both the hilly and lowland regions.

C. candidum Willd. Rare. In a sphagnum swamp near Syracuse, and some years abundant there. Specimens from there are in several herbaria. Mr. Paine remarks that it is to be looked for in places where its companion plants, *Parnassia Caroliniana* and *Valeriana sylvatica*, grow. Paine did not know of this station but his observations upon its companion plants are well borne out here, the two mentioned being very abundant, as is also *Dasiphora fruticosa*.

C. hirsutum Mill. Rare. Jamesville, Onondaga Co.; Munnsville, Madison Co.

C. parviflorum Salisb. Common. Syracuse, Onondaga Co., *Underwood*, 1890.

Galeorchis Rydb.

G. spectabilis (L.) Rydb. Not rare. Jamesville, Onondaga Co., *Underwood;* Kirkville, Onondaga Co., *Underwood;* Oneida, Madison Co.

Orchis L.

O. rotundifolia Pursh. Very rare. Reported by Paine from Herkimer Co. There are specimens in the herbarium of Columbia University from near Utica, Oneida Co., collected by E. Hunt.

PERULARIA Lindl.

P. flava (L.) Rydb. Very rare. Specimen in the Columbia herbarium collected by Asa Gray in 1834 in Oneida County.

COELOGLOSSUM Hartman

C. bracteatum (Willd.) Parl. Found by Asa Gray, according to Paine, at Fairfield, Herkimer Co.; Sangerfield, Oneida Co.; and Brookfield, Madison Co.

GYMNADENIOPSIS Rydb.

G. clavellata (Michx.) Rydb. Common.

LIMNORCHIS Rydb.

L. hyperborea (L.) Rydb. Rare. Jamesville, Onondaga Co., *Underwood*, 1891. Nearly all the so-called *hyperborea* of this region belongs with the next species. The real *L. hyperborea* is sub-arctic and its occurrence in this region is rare. All of the specimens collected by Prof. Underwood and cited by Dr. Rydberg under *Limnorchis hyperborea* (Bull. Torrey Club, 28 : 620. 1901), with the exception of the one cited above, belong to the next.

L. Huronensis (Nutt.) Rydb. Common. In part, the *Habenaria hyperborea* of Gray's Manual.

L. dilatata (Pursh) Rydb. Common.

L. dilatata linearifolia Rydb. Rare. Bridgewater, Oneida Co., the type collected by Asa Gray.

LYSIAS Salisb.

L. orbiculata (Pursh) Rydb. Rare. Reported from southern Herkimer Co. by Paine, also from Oneida Co. Fiddler's Green, Pecksport, Madison Co., *Underwood*.

L. Hookeriana (A. Gray) Rydb. Rare. Kirkville, Onondaga Co., *Underwood;* Baldwinsville, Onondaga Co., *Beauchamp*. Reported by Paine from Oneida and Herkimer counties.

LYSIELLA Rydb.

L. obtusata (Pursh) Rydb. Very rare. Reported by Paine from Herkimer Co.

BLEPHARIGLOTTIS Raf.

B. ciliaris (L.) Rydb. Not common. Baldwinsville, Onondaga Co., *Beauchamp.* Paine does not report this plant from central New York, the nearest station he gives being Schenectady on the east and Seneca Co. on the west. I have found it in woods on the pine plains east of Sylvan, Oneida Co.

B. blephariglottis (Willd.) Rydb. Scarce. Reported by Paine from Oneida and Herkimer counties.

B. lacera (Michx.) Rydb. Common. Usually growing in wet meadows or damp shady places.

B. leucophaea (Nutt.) Rydb. Very rare. "Lily marsh," Oswego Co., *J. H. Wibbe*, 1876.

B. psycodes (L.) Rydb. Common.

POGONIA Juss.

P. ophioglossoides (L.) Ker. Scarce. Kirkville and Baldwinsville, Onondaga Co., *Beauchamp.*

ISOTRIA Raf.

I. verticillata (Willd.) Raf. Rare. Baldwinsville, Onondaga Co., *Beauchamp*, 1887; *Brower*, 1887 and 1889; *Underwood*, 1890. "Lily marsh," Oswego Co., *J. H. Wibbe*, 1876. Reported by Paine from Oneida County.

TRIPHORA Nutt.

T. trianthophora (Sw.) Rydb. Rare. Clay swamp near Syracuse, Onondaga Co., *Underwood*, 1888; *Mrs. M. O. Rust*, 1883. Reported by Paine from Madison and Oneida counties.

ARETHUSA L.

A. bulbosa L. Very rare. Syracuse, Onondaga Co., *Underwood*, *Brower.* Reported by Paine from near Rome, Oneida County; also in Herkimer County.

LIMODORUM L.

L. tuberosum L. Common in all sphagnum bogs.

EPIPACTIS R. Br.

E. viridiflora (Hoffm.) Reichb. Rare. Otisco Lake, Onondaga Co., *S. N. Cowles*, 1889. Near Syracuse, *Mrs. M. O. Rust*,

Underwood. "First discovered in central New York by Mrs. M. P. Church, of the Syracuse Botanical Club, on August 6, 1878, on a hill under beeches, elms, maples and a few pines." (Bull. Torrey Club, 6: 329. 1879.)

GYROSTACHYS Pers.

G. stricta Rydb. Common. Most of the so-called *G. Romanzoffiana* reported from this region probably belongs here, the true *G. Romanzoffiana* being Alaskan.

G. plantaginea (Raf.) Britton. Common.

G. cernua (L.) Kuntze. Common.

G. praecox (Walt.) Kuntze. Scarce. Oneida, Madison Co., *House.* Specimens collected in 1902, in the herbarium of the New York Botanical Garden, were identified by Dr. Rydberg.

G. gracilis (Bigel.)Kuntze. Rare. Sylvan Beach, Oneida Co., *Underwood, House, Paine.* Reported by Paine from Little Falls, Herkimer County.

LISTERA R. Br.

L. cordata (L.) R. Br. Syracuse, Onondaga Co., *Underwood.* Reported by Paine from Oneida and Herkimer counties.

L. australis Lindl. Rare. Baldwinsville, Onondaga Co., *Underwood, Beauchamp.* "Lily marsh," Oswego Co., *J. H. Wibbe.*

PERAMIUM Salisb.

P. repens (L.) Salisb. Scarce. Reported by Paine from Deerfield and Point-of-Rock Lake, Oneida County.

P. pubescens (Willd.) MacM. Scarce. Silver Beach, Oneida Co., *House.*

ACHROANTHES Raf.

A. monophylla (L.) Greene. Rare. Bridgewater, Oneida Co., collected by Asa Gray in 1834 (in the Columbia herbarium). Reported by Paine from the vicinity of Utica; also in Herkimer County.

LEPTORCHIS Thouars

L. liliifolia (L.) Kuntze. Scarce. Oneida, Madison Co., *House.* Reported by Paine from Verona and Clark's Mills, Oneida County.

L. Loeselii (L.) MacM. Common. Oneida, Madison Co., *Maxon, House.* Kirkville, Onondaga Co., *Underwood.* Reported by Paine from Oneida Lake and from Herkimer County.

CALYPSO Salisb.

C. bulbosa (L.) Oakes. Mud Lake, Herkimer Co., *E. Hunt.*

APLECTRUM Nutt.

A. spicatum (Walt.) B.S.P. Rare. Jamesville, Onondaga Co., *Underwood.* Reported from several places in Oneida County by Paine.

Aplectrum spicatum pallidum var. nov. Similar to the type, but the flowers lemon-yellow or greenish-yellow, without the usual purplish spots. Type in the herbarium of Columbia University, collected by Professor Underwood at Jamesville, Onondaga County, 1890.

CORALLORHIZA R. Br.

C. Corallorhiza (L.) Karst. Common. Baldwinsville, *Beauchamp;* and Syracuse, Onondaga Co., *Underwood.* Reported from Oneida and Herkimer counties by Paine.

C. odontorhiza (Willd.) Nutt. Not rare. Syracuse, Onondaga Co., *Underwood.* Reported from Oneida County by Paine.

C. multiflora Nutt. Common. Oneida, Madison Co., *House.* Pompey and Syracuse, Onondaga Co., *Underwood.*

DEPARTMENT OF BOTANY, COLUMBIA UNIVERSITY,
April 1, 1903.

VAGARIES OF HEPATICA*

BY F. A. ROSS

(WITH FIGURES 1–45.)

No better inducement to companionship with plants could be desired than the discovery of a group of plants which seem to be at play. The mutation theory of de Vries gives new prom-

* Abstract of a paper read at the eighth winter meeting of the Vermont Botanical Club, January 17, 1903.

inence to individual variations in connection with the genesis of species, and the study of such variations becomes significantly important.

On a headland of Lake Champlain, the writer has discovered most interesting variations of our two species of *Hepatica*. While the divergence from the normal was mainly in the definite direction of increase in the number of leaf lobes, it was the anomalous and unexpected forms that roused the greatest interest and presented the greatest problem. These aberrant forms seemed like the capricious expression of superabundant spirits, and might have been partly due to energy and material left free by the absence of seed-formation. Rich and abundant nutriment was another factor, producing many large leaves. However fantastic or grotesque was the configuration of the leaf, it retained the characteristic texture and style of venation. Many leaves were flat, thin, broad, and sometimes glabrous; others were thick and puckered along the edges. In many cases there was no sinus at the insertion of leaf on petiole, showing such contrasting modes of insertion as are exhibited by Figs. 13 and 41. Position and prominence of the sinuses and number and relative size of lobes gave each leaf its peculiar shape. Broad and shallow sinus, deep and narrow cleft, lobes well separated or overlapping, broad and rounded or long and pointed, gave seemingly inexhaustible variety of interesting contours, ranging from reniform and indistinctly lobed leaves, two- to nine-lobed, two- and three-parted leaves, those with lobes metamorphosed into leaflets, to monstrous forms whose profiles gave caricatures of faces. The novelty of the odd shapes gave entertainment, while leaves like Figs. 33 and 36 pleased the eye by bilateral symmetry.

Over five hundred leaves, presenting a bewildering diversity of forms, were collected and mounted for deposit in the herbarium of the University of Vermont. With such an embarrassment of riches, it has been no light task to choose for reproduction the few that could be presented with this paper. It was deemed worth the trouble to present the venation of each leaf in order to depict its relation to the contour. Each figure is an approximate

facsimile of the mounted specimen, the outlines having been traced from the dried leaf and the venation reproduced by free-hand drawing. The plate gives a reduction of one half natural size.

Many leaves spanning more than four inches were found. The one represented by Fig. 29 lacked a full half inch of spreading half a foot from tip to tip. Figs. 1 and 36 are especially interesting, perhaps the one showing the simple ancestral form and the other an ambitious prefiguration of the future ideal. Figs. 19 and 39 have small and curious outgrowths on the margins. Figs. 38, 40, 41, 42 and 43 are of special interest. Fig. 42 is puzzling, and was taken from a plant showing normal leaves. Some plants had but a single leaf with more than three lobes, while others had leaves variously lobed. One plant had 3 five-, 1 six-, 1 seven-, 2 eight-, and 1 nine-lobed leaves; another 3 five-, 4 six-, 1 seven-, 1 eight-, and 3 nine-lobed.

The discovery of the particular locality where extreme variation occurred was too late in the season of 1902 to allow much observation of the flowers. Among the few found, many variations were noted. Dioecious forms of flowers occurred frequently. The pistillate flower was small and set in an overgrown involucre, while staminate flowers were large and the involucre correspondingly reduced. Fig. 44 shows the pistillate flower, and in the same figure is depicted a tendency to lobing seen in few of the sessile leaves of the involucre. Some flowers had four and five leaves in the involucre, and Fig. 45 shows another tendency of separation of flower and involucre.

The variations illustrated by the accompanying figures are certainly pronounced. Whether they are sufficiently self-perpetuating and sufficiently capable of segregation into definite groups to be worthy of consideration as possible mutants in a de Vriesian sense, the writer does not assume to say.

BURLINGTON, VERMONT,
March, 1903.

R.R. del.

LEAVES OF HEPATICA.

A KEY TO THE NORTH AMERICAN SPECIES OF LENTINUS—II *

By F. S. Earle

Section Lepidei

1. Large; pileus reaching 15 cm. or more. 2.
   Medium; pileus 4–10 cm. 4.
   Small; pileus less than 4 cm. 5.

2. Pileus straw-colored with black punctate scales. *L. maximus* Johns.
   Pileus white or whitish, areolate-scaly. 3.

3. Stipe excentric; cespitose; spores 13–16 $\mu \times$ 5–6 μ. *L. Underwoodii* Pk.
   Stipe central; gregarious; spores 8 $\mu \times$ 4 μ. *L. magnus* Pk.

4. Pileus 5–10 cm., scales spot-like, brown; spores 10–14 $\mu \times$ 6 μ. *L. lepideus* Fr.
   Pileus 4–6 cm., scales punctate, black; spores 6–7 $\mu \times$ 3 μ. *L. tigrinus* (Bull.) Fr.

5. Pileus sulcate-striate, reddish. *L. sulcatus* Berk.
   Pileus even on the margin. 6.

6. Cespitose; pileus yellowish to ferruginous, pilose-squamose. *L. pholiotoides* Ell. & Anders.
   Scattered; pileus brownish, punctate-squamose. *L. Ravenelii* B. & C.

Section Cochleati

1. Stipe glabrous. 2.
   Stipe velvety or strigose, at least below. 6.

2. Cespitose. 3.
   Scattered or only gregarious. 5.

3. Lamellae brownish, edge white; stipe hollow. *L. friabilis* Fr.
   Lamellae whitish; stipe solid. 4.

4. Lamellae with the edge serrate. *L. cochleatus* Fr.
   Lamellae with the edge entire. *L. cochleatus occidentalis* Fr.

5. Pileus deeply umbilicate; stipe concolorous. *L. umbilicatus* Pk.
   Pileus expanded or subdepressed; stipe short, shining reddish-brown. *L. haematopus* Berk.

6. Pileus infundibuliform. 7.
   Pileus depressed or umbilicate. 8.

7. Small; pileus 12–13 mm.; lamellae entire. *L. Curtisii* Sacc. & Cub. (= *L. omphalodes* B. & C., not Fr.)
   Larger; pileus 2–3 cm.; lamellae serrate. *L. Americanus* Pk.

8. Pileus ochraceous; stipe dark brown. *L. Michneri* B. & C.
   Pileus alutaceous-fuscous; stipe pallid. *L. detonsus* Fr.

* Continued from page 38.

Section CORNUCOPIOIDES

1. Stipe glabrous. 2.
   Stipe not glabrous. 5.

2. Pileus pallid. 3.
   Pileus ochraceous, 6–10 cm.; lamellae fulvous. *L. patulus* Lév.
   Pileus dark brown. 4.

3. Pileus membranous, flaccid. *L. flaccidus* Fr.
   Pileus fleshy-coriaceous, rigid. *L. glabratus* Mont.

4. Stipe striate; pileus 5 cm. *L. fuligineus* B. & C.
   Stipe smooth; pileus 7–8 cm., papery. *L. exilis* Klotzsch

5. Cespitose. 6.
   Not cespitose. 7.

6. Small; pileus 2–3 cm.; stipe lanuginose. *L. parvulus* B. & C.
   Larger; pileus 7–10 cm.; stipe scaly. *L. pallidus* B. & C.

7. Pileus deeply infundibuliform or tubular. *L. Robinsonii* Mont.
   Pileus convex or plane. 8.

8. Stipe straight, longer than the diameter of the pileus. *L. Mancinianus* Sacc. & Cub.
   Stipe curved, shorter than the diameter of the pileus. 9.

9. Lamellae separating from the stipe when dry. *L. Cubensis* B. & C.
   Lamellae not separating from the stipe. *L. proximus* B. & C.

Sections PLEUROTI AND RESUPINATI

1. Pileus dimidiate. 2.
   Pileus resupinate. 9.

2. Pileus strigose, velvety or scaly. 3.
   Pileus glabrous. 5.

3. Pileus thin, membranous, strigose, fusco-cervinous. *L. pelliculosus* (Schw.) Fr.
   Pileus thin, flabelliform, farinaceous-tomentose, white. *L. Verae-Crucis* Berk.
   Pileus soft, fleshy. 4.

4. Pileus corrugated; spores 1.5–2 μ. *L. vulpinus* Fr.
   Pileus even; spores 4 μ, rough. *L. ursinus* Fr.

5. Pileus white or whitish. 6.
   Pileus reddish or brownish. 8.

6. Pileus membranous; lamellae closely crowded. *L. pectinatus* (Schw.) Fr.
   Pileus fleshy. 7.

7. Pileus very large and thick (15 cm.); odor none. *L. Chama* (Bosc) Fr.
   Pileus smaller, thin; odor of *Melilotus* on drying. *L. suavissimus* Fr.

8. Pileus and lamellae reddish; pileus glabrous, subrugose. *L. castoreus* Fr.
   Pileus and lamellae reddish; pileus glabrate, thinner. *L. castoreus pusillus* B. & C.
   Pileus pale fuscous; lamellae paler. *L. castoreus hirneoloides* B. & C.

9. Pileus villous, cervinous, very thin; lamellae pallid. *L. tenuissimus* (Schw.) Fr.
   Pileus glabrous; lamellae white. *L. proboscideus* Fr.

EXCLUDED SPECIES

Lentinus caespitosus Berk. Hook. Lond. Jour. 6: 317. 1847.

This seems to be a *Clitocybe*, probably the same as *Clitocybe monodelpha* Morg.

Lentinus verrucosus (Kickx) Sacc. Syll. Fung. 5: 613. 1887.

This is a *Lenzites;* see Bull. Acad. Sci. Brux. 8^2: 73. 1841; also, Sacc. Syll. Fung. 9: 78. 1891.

NEW YORK BOTANICAL GARDEN.

EXPLOSIVE DISCHARGE OF ANTHEROZOIDS IN CONOCEPHALUM

BY CYRUS A. KING

In June, 1902, Dr. George J. Peirce published in the *Bulletin of the Torrey Botanical Club* some observations on the forcible discharge of the antherozoids of *Asterella Californica.*

He made the discovery in January, 1901, but in January, 1902, the subject was studied in more detail. He found that antherozoids were forcibly ejected under natural conditions as well as in the laboratory, and that in some cases they were thrown to a vertical height of 14–20 cm. The expulsion was found to be due to the increased turgidity of certain cells within the antheridium and of others in the cushion below it. The mutual pressure due to the increased turgidity in both regions produced the rupture above, where there was no external pressure on the antheridium.

F. Cavers (Annals of Botany, January, 1903) has noticed the expulsion of antherozoids also from *Conocephalum conicum* (*Fegatella conica*). His observations were made first in the laboratory and were confirmed later under natural conditions. He found that the antherozoids were thrown to a height of more than two inches and that the explosions were most frequent on moist, sunny days and when exposed to direct sunlight.

In March, 1901, the writer also observed the forcible expulsion of antherozoids from *Conocephalum conicum.* The material was growing in an experiment room at Indiana University and

was so situated that it was exposed only to the morning sun. (The room was thoroughly sprayed from a hydrant both morning and evening.) The explosions occurred after four in the afternoon and immediately followed a spraying of the plants. Within one to three minutes the plants looked as if smoke was coming from them. This was so conspicuous as to be noticed from any part of the room. A closer view showed that the smoke-like substance was coming in little puffs from the surface of the liverworts, not unlike a tiny battery. The material seemed most abundant from two to four inches above the plants. The writer and Professor Mottier both held slides over the plants and caught the spermatozoids in great numbers. The conspicuous discharges lasted only about five minutes and in four or five minutes more none could be noticed.

The above observations seem to indicate that *moisture alone* may be the inciting cause of the explosion in *Conocephalum conicum*.

DeWitt Clinton High School, New York City,
March 16, 1903.

PROCEEDINGS OF THE CLUB

Wednesday, February 25, 1903

The Club met at the usual hour at the New York Botanical Garden, with President Brown in the chair. There were 30 persons present.

The resignation of Professor H. F. Osborn, of New York City, was accepted.

The president announced the following standing committees for 1903:

Committee on Finance: H. H. Rusby, J. I. Kane, C. F. Cox.

Committee on Admissions: Cornelius Van Brunt, Delia W. Marble, J. K. Small.

Committee on Local Flora: Phanerogamia — N. L. Britton, E. P. Bicknell, H. H. Rusby, Fanny A. Mulford. Cryptogamia — L. M. Underwood, M. A. Howe, Elizabeth G. Britton.

Committee on Program: N. L. Britton, M. A. Howe, L. M. Underwood.

The membership of the Field Committee will be announced later.

The first paper on the scientific program was by Dr. Hollick on "Fossil Figs, with Description of a new Species from the Dakota Group of Kansas." In the author's absence, it was read by Dr. Howe. The paper is published in full in the February number of the *Bulletin*.

The second paper was by Mrs. Alice R. Northrop on "The Flora of Nashawena Island, Massachusetts."

This is one of the Elizabeth Islands lying southwest of Woods Holl. It is about three miles long by one mile wide. It is owned privately and was formerly largely in cultivation, but is now used as a sheep pasture, and is much grown up with bushy thickets. The soil is glacial drift, being part of a terminal moraine, like Martha's Vineyard, Nantucket, etc. The surface is quite uneven, with many knobs and undulations and with numerous small ponds in the depressions. The south shore is steep and abrupt, rising to an elevation of 70 to 80 feet and gradually sloping to the northward. The greatest elevation at any point is 120 feet.

The forest areas are confined to the depressions. The tops of the trees are much flattened owing to the strong winds, and none of them reaches above the level of the protecting hills. The largest trees are not over 30 feet high and 12–15 inches in diameter. While the trees are stunted, the shrubs and bushes growing in their shelter are often unusually large and vigorous.

The plant-covering of the island can be conveniently classed in four groups. First, the halophytes along the shore. Second, the hydrophytes occupying the numerous ponds and marshy places. Third, the forest areas, and fourth, the plants of the open downs.

The halophytes include the usual beach plants of the region. Two of special interest were a *Teucrium* and a *Plantago*, both of which have been recently described as new by Mr. Bicknell.

The hydrophytic vegetation of the ponds and their border was

very rich and included a large number of species, but none that was particularly noteworthy.

The prevailing trees of the forest areas are red maple and the black oak, *Quercus velutina*. *Q. alba*, *Q. Marylandica*, beech, sour gum (*Nyssa*), sassafras and holly (*Ilex opaca*) also occur. The more abundant shrubs are pepper bush, button bush, *Amelanchier*, *Kalmia angustifolia*, *Vaccinium corymbosum*, sweet gale, choke cherry, etc. *Smilax rotundifolia* is very abundant. Orchids were abundant, as many as ten species being found. On the drier hills, *Gaylussacia resinosa* was abundant, but it produces little fruit owing to the attack of a fungus, *Exobasidium*. In the swamps, *Osmunda cinnamomea*, *Woodwardia areolata* and *W. Virginica* were very abundant and luxuriant.

In all, 335 species of flowering plants were collected on the island, without including all of the grasses and sedges.

After an interesting discussion the Club adjourned.

F. S. Earle,
Recording Secretary.

Wednesday, March 10, 1903

The Club met at the College of Pharmacy at 8 p. m.; Professor Lloyd in the chair; 22 persons present.

The first paper on the scientific program was by Miss Rosina J. Rennert, under the title of "Notes on the Anatomy and Physiology of *Oxypolis filiformis*."

This investigation was carried on under the direction of Dr. MacDougal, of the New York Botanical Garden. *Oxypolis filiformis* is an umbellifer growing on the margins of ponds and swamps in southern United States and in Europe. Its leaves are reduced to awl-shaped septate phyllodes, giving the plant a rush-like appearance. In a paper on septate leaves in dicotyledons, Briquet describes the anatomy of the phyllode minutely. He found six tissues in the leaf, epidermis, hypoderm, chlorenchyma, fibro-vascular bundles, endoderm, and a loose stellate-celled tissue occupying the central core. He regards some of these characters as strongly hydrophytic and others as xerophytic and explains the possession of characters suited to such

opposed conditions as an adaptation to the changes obtaining in the swamp habitat. In the early spring and summer moist conditions prevail. In the late summer and fall, the swamps present conditions conducive to transpiration and thus the xerophytic features of the plant come into play.

Plants from Georgia in the herbarium of the New York Botanical Garden were found to possess in all cases minute depressions or pits along the phyllode. Beneath the floor of the pit is a smaller-celled compact secretory tissue containing resin and serving as a resin gland.

By submerging some plants and growing others in a saturated atmosphere, a marked change in the phyllodes produced after the change in the conditions was inaugurated became evident. The phyllodes were hollow, absolutely terete, and exhibited no trace of resin glands. Microscopic examination revealed an entire absence of cuticle, hypoderm, secretory tissue and central stellate tissue, a reduction of the number of stomata, of the xylem in the bundles, of the chlorenchyma, and of the endoderm. These changes are such as tend toward a suppression of xerophytic features or serve as means of adaptation to moist conditions and therefore hydrophytic in their nature. The xerophytic nature of the normal form is so plainly indicated by the thick cuticle, the hypoderm and the possession of resin glands, that it seems reasonable to supersede Briquet's explanation of the structure of the plant by one less cumbersome. This is, that in the modified plant we see the hydrophytic form but that normally *Oxypolis filiformis* is never a hydrophyte but rather a swamp xerophyte.

The paper was discussed by Dr. MacDougal, Dr. Barnhart and Professor Lloyd, Dr. MacDougal remarking upon *Oxypolis filiformis* as a fine example of plasticity in plants.

The second paper was by Mr. Edward W. Berry and was entitled, "Notes on the Matawan Formation and its Flora."

The Matawan formation was briefly characterized and its areal and vertical range discussed. It consists of clays and sands closely related to those of the Raritan formation, and extends from Raritan Bay in Monmouth County, New Jersey, southwest-

erly to the Potomac River, becoming gradually narrower and thinner to the southward. The formation is of mid-Cretaceous age and marks the transition period from the underlying fresh-water Raritan deposits to those of the overlying marine Monmouth formation. The only locality where plant remains have been found is on Raritan Bay near Keyport, where the formation makes a bluff some thirty feet high, fronting on the bay. Mr. Berry enumerated sixty-seven species of plants from this locality, which is commonly known as Cliffwood. The plants occur in the clay and furnish most beautiful, but evanescent specimens. New species were obtained in *Arisaema*, *Carpolithus*, *Aralia*, *Quercus*, *Sterculia*, *Celastrophyllum*, *Salix*, *Eucalyptus* and *Nelumbo*. These will shortly be published in the *Bulletin of the New York Botanical Garden*. The flora is very closely related to that of the Raritan formation, and a marked feature is the entire absence of ferns, remains of which have not as yet been found, although they form over five per cent. in the underlying Raritan. Remarkable remains are those of *Moriconia cyclotoxon* D. & E., a widespread and beautiful member of the Cupressineae. The Matawan specimens of this differ in being about twice the size of any forms heretofore discovered. Among the most abundant remains are scales supposedly related to the Araucarian genus *Dammara*, and twigs and cones of *Sequoia*. Twigs of *Cunninghamites* are also abundant.

The flora shows a rather striking resemblance to that from the Atane beds of Greenland, the large-leaved *Aralia Ravniana* Heer from that formation reappearing in considerable numbers. Other points of resemblance are identical species of *Sequoia*, *Sapindus*, *Laurus*, *Andromeda*, *Moriconia*, *Aralia*, *Magnolia*, *Dewalquea*, etc. This Matawan flora is the latest known Cretaceous flora of the Atlantic coastal plain, all the overlying formations being marine. The paper was illustrated with drawings, photographs of the plant beds, and specimens.

Professor Lloyd called the attention of the Club to a simple form of auxanometer, consisting of a vertical lever, carrying the record, moved once an hour and so marking off equal intervals of growth, the movement being accomplished by an arm carried

on the minute-hand spindle of a cheap clock. This method obviates the use of a cylinder, which is difficult to arrange.

Adjournment followed.

MARSHALL A. HOWE,
Secretary pro tem.

NEWS ITEMS

Dr. and Mrs. N. L. Britton returned to New York on April 3 from a collecting expedition to Cuba. Most of their three weeks on the island was spent in the vicinity of Matanzas.

The Connecticut Botanical Society's committee on the lower cryptogams has been constituted as follows : *Bryophyta :* Professor A. W. Evans, New Haven ; *Algae :* Mr. Isaac Holden, Bridgeport ; *Fungi :* Dr. G. P. Clinton, New Haven.

We learn from *Science* that Dr. Frederick DeForest Heald, now professor of biology in Parsons College, Iowa, has been elected adjunct professor of plant physiology and general bacteriology in the University of Nebraska.

Professors Volney M. Spalding, of the University of Michigan, and W. A. Setchell, of the University of California, have been granted a year's leave of absence by their respective institutions, and will devote this time largely to travels and botanical investigations in Europe.

Professor F. S. Earle, of the New York Botanical Garden, returned on April 2 from Cuba, where, in company with Professor L. M. Underwood and Mr. E. W. D. Holway, he has been making collections of fungi in the neighborhood of Santiago and Baracoa. Professor Underwood has returned to Jamaica to continue the explorations begun by him there in January.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–29 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–29 (1882–1902) are furnished at the published price of two dollars each; Vols. 28 and 29, three dollars each.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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Vol. 3 No. 5

TORREYA

May, 1903

NOTES ON THE STRAND FLORA OF GREAT INAGUA, HAITI AND JAMAICA

By John W. Harshberger

Great Inagua lies in latitude 21° north and between longitude 73° and 74° west, and is the most southerly of the Bahama Islands. It is forty-five miles in length and from seven to seventeen miles in breadth. Two sandy bays on the leeward, or western side of the island afford safe anchorage for all kinds of steam and sailing vessels. Man-of-war Bay is the northern one, while Matthewtown is situated on the southern one, and is the entrepôt of the island. The anchorage is some distance from the shore and affords about five fathoms of water. The shores of the southern bay are rocky, with scattered sandy beaches formed by the ground-up coral rock. The rock is of aeolian formation, similar to that found in other Bahama islands.* Along the edge of the sea the surface erosion of the rocky strand is most striking and characteristic. The rocks are honeycombed with holes, pits and cavities of all sizes, locally known as "banana holes." The following plants were noted on the strand during the call of the steamer Belvernon at Matthewtown on July 1, 1901. Growing in small rock pockets influenced by the salt spray, *Portulaca oleracea* L. var. *parvifolia* was gathered. Forming a second line of plants, the seaside grape, *Coccoloba uvifera* L., *Tournefortia gnaphalodes* R. Br., *Bucida Buceras* L., *Rhachicallis rupestris*, DC. may be said to be character plants.† Together, these species

* Northrop, Alice R., Flora of New Providence and Andros. Mem. Torrey Club, 12 : 2. 1902.

† The writer owes the determination of his West Indian collection of plants to Dr. I. Urban, of the Berlin Botanic Garden, to whom his thanks are due.

[Vol. 3, No. 4, of Torreya, comprising pages 49–66, was issued April 18, 1903.]

occupy the treeless sea strand formation and form the Portulaca-Coccoloba association, speaking ecologically.

The thicket formation on the strand consists of the association of *Phyllanthus epiphyllanthus* L., with cladodes six inches long, three quarters of an inch wide, *Acacia Farnesiana* Willd., *Tournefortia volubilis* L., *Xylosma buxifolium* A. Gray, *Opuntia* sp. and *Urechites suberecta* Muell. Arg., a climbing plant which grows over the bushes composing the thicket.

The sidewalks of the main street of Matthewtown are planted with *Casuarina equisetifolia* Forst., which reaches a height of about thirty feet and affords a scanty shade from the sun-glare. The flamboyant tree, *Poinciana regia* Bojer, also occurs here and there along the streets, while as ruderal plants the writer picked up *Abutilon Indicum* Don, *Stachytarpheta Jamaicensis* Vahl and *Cassia scricea* Sw. Growing in the somewhat neglected gardens, the botanist notes *Cordia Sebestena* L., the anaconda tree of the negroes, *Thespesia populnea* Soland., *Lawsonia inermis* L., *Cocos nucifera* L., *Agave* sp., *Carica Papaya* L. and *Eucalyptus Globulus* Lab.

The north coast of Haiti is about sixty miles from Great Inagua across the Windward Passage. Cape Haitien is the most important city on the north coast and lies in a beautiful bay open to windward and protected by a long coral reef upon which in December, 1492, one of the caravels of Columbus was wrecked. The town is surrounded by mountains two thousand feet high, while farther inland, mountains eight thousand feet in elevation are encountered. One of the most favorable localities for botanizing is in a valley back of the town through which a limpid stream of water flows. The following plants were noted there as herbs or woody species along the roadside, viz., *Palicourea Pavetta* DC., *Salvia micrantha* Vahl, *Lepidium Virginicum* L., *Leonurus Sibiricus* L., *Sida acuta* Burm., *Hamelia patens* Jacq., *Tephrosia purpurea* Pers., *Spermacoce laevis* Lam., *Achyranthes aspera* L. var. *obtusifolia* Lam., *Centrosema Virginianum* Benth., *Rauwolfia canescens* L., *Solanum aculeatissimum* Jacq., *Hibiscus Boryanus* DC., *Hibiscus vitifolius* L., *Vinca rosea* L., *Parthenium Hysterophorus* L. and the cosmopolitan *Argemone Mexicana* L.

Climbing over the herbs and other plants, *Plumbago scandens* L. forms an element in the roadside vegetation.

The plants of the highways leading into Port-au-Prince, the capital of Haiti, differ materially from those collected along the roads on the north coast. The following plants were found along the southwestern suburban roads, viz., *Cordia serrata* (L.) Gürke., *Commelina Virginica* L., *Echites umbellata* Jacq., *Echites Neriandra* Griseb., *Wedelia Ehrenbergii* Schlecht., *Sida acuta* Burm., *Parthenium Hysterophorus* L., *Spermacoce laevis* Lam., *Barleria lupulina* Lindl., *Acalypha alopecuroidea* Jacq., *Bouchea Ehrenbergii* Cham., *Leucaena glauca* Benth., *Cassia sericea* Sw., *Moringa pterygosperma* Gaertn. *Momordica Charantia* L. is the only climbing plant gathered and it is extremely common, growing over other plants and the fences. Higher up on the hillsides along the bridle-paths, *Acacia macracantha* H. & B. and *Bauhinia variegata* L. occur in the thickets.

The plants found by the writer in the streets of Aux Cayes on the south coast of Haiti are worthy of mention in connection with the enumeration of the above wayside species. Aux Cayes lies on a restricted, low-lying coastal plain and during heavy rains the streets are flooded with water. *Argemone Mexicana* L. and *Lantana Camara* L. are common weeds. *Cleome spinosa* Jacq., var. *pungens* Willd., *Cassia occidentalis* L., *Solanum mammosum* L., and *Malachra* sp. are typical ruderal plants. The old moss-grown walls of deserted buildings are covered with patches of a small herb, *Pilea microphylla* Liebm., while growing in the marshes near the principal wharf, the white mangrove, *Laguncularia racemosa* Gaertn. and a sedge, *Fimbristylis ferruginea* Vahl, are the principal character plants.

The harbor of Port Antonio, Jamaica, is entered by two channels separated from each other by Navy Island and its outlying coral reefs. The western channel is passable only to small sailing craft, while the eastern channel between Navy Island and a tongue of the mainland is navigable by the largest ocean-going steamers. Navy Island is used to pasture cattle upon, and hence it is grass-grown with only a few trees upon it and these grow near the shore line. *Laguncularia racemosa* Gaertn., the almond

tree, (*Terminalia Catappa* L.), *Cocos nucifera* L. and *Anona muricata* L. were the arborescent species collected by the writer on this island. *Ipomoea Pes-caprae* Sw. is the character plant of the low beaches, while *Lantana trifolia* L., *Solanum torvum* Sw., *Solanum Jamaicense* Mill., *Bidens leucantha* Willd., and *Wedelia carnosa* Pers. are species that have withstood destruction from cattle. The marshy places of the island support *Mariscus rufus* H.B.K. and a sedge, *Fimbristylis spadicea* Vahl.

Located at the extremity of the peninsula of land between the east and the west harbors is an old abandoned fort. The rocks immediately in front of the grass-grown sward about the fort are honeycombed by the waves. On these rocks projecting over the sea and in storms wet by the spray that is tossed up from beneath, a few plants seem to thrive, viz., *Wedelia carnosa* Pers., *Coccoloba uvifera* L., *Ruellia tuberosa* L., *Crotalaria incana* L. and *Plumeria* sp. Hanging over the rocks and lying prostrate on the ground, *Borrichia arborescens* (L.) DC. completes the list of observed strand plants.

Little has been done on a comparative study of the floras of the several Bahama islands and that of the Greater Antilles. Our knowledge as yet is very fragmentary and this article is presented as in part a contribution to a comparative study of the flora of the West Indies.

University of Pennsylvania.

OBSERVATIONS ON ETIOLATION

By Carlton C. Curtis

The position recently taken by Dr. MacDougal * as to the action of light upon growth must find ample support from the results obtained in every laboratory. I doubt not that it is a common experience that better illustrations of etiolation are obtained under feeble illumination than in darkness. It has always been a source of surprise to me to note the amount of light that

* Influence of Light and Darkness on Growth and Development. Mem. N. Y. Bot. Garden, 2:—. 1903.

many plants can endure and still show the familiar characters of so-called etiolated forms. Plants grown in dark chambers to which a meager amount of feeble diffuse light is admitted show, in my experience, more marked "etiolated" characters than when grown in the dark room. While there is a wide difference in the response of plants to varying intensities of light, in a general way it may be stated that nearly all will endure a surprising amount of illumination without receiving a sufficient stimulation to enable them to accomplish the morphological differentiation that is associated with light. . The potato vine furnishes one of the best examples that I recall of the amount of light that a plant can endure without loss of etiolated characters. This difference in behavior of plants in feeble light and in darkness amounts to a demonstration of the non-paratonic action of light upon many plants at least. When growth occurs in absolute darkness the environment is so unfavorable that pathological conditions soon arise, or the vital processes are carried on under such abnormal conditions that it often appears impossible to interpret the reactions or explain them as due to any particular cause. The considerable variation that is often to be seen in a series of any species of plant is doubtless an illustration of this fact. The entire vital mechanism of the plant is out of order through lack of the normal controlling and directive impulses. Under such circumstances a factor of little moment or unmeasurable in its influence may now become a controlling force in producing a certain development. I have often had occasion to note the marked influence that a slight increase in the humidity has upon growth. Shoots of potatoes produced a more rapid and pronounced elongation when covered than was the case with stems growing beside them, though both were at first in an atmosphere containing 50 per cent. of moisture. Without doubt this reaction is largely attributable to the amount of moisture furnished to the reserve food in the tuber. In the same way tubers and bulbs usually develop more vigorous growths when planted than when laid upon moist sand or sphagnum. This is true even when they are covered with cans that ensure a high percentage of moisture to the plant. It is possible that the manner of presentation as well

as the amount of moisture may be a factor in the results obtained. These instances are mentioned as illustrations of the fact that in etiolation phenomena we are dealing with a growth in which the propelling forces are so weak and so simplified, comparatively speaking, that as a result the slightest cause may lead to marked deviations. This may explain the variations that were noticed in a series of etiolated seedlings of *Quercus velutina*. In one experiment a few of the plants showed a second growth, that might be interpreted as adaptive, although the majority perished before or after the usual number of scales and leaves were developed. In another case several plants showed a continued growth without any interruption, and finally developed the same number of leaves as were found upon the plants that exhibited the renewal of growth. They developed, however, a greater length of stem, and the leaves were not clustered as in the first case, but were separated by fairly regular intervals. In the second experiment, the plants were germinated in feeble light, but were removed to the dark room as soon as the first shoots appeared above the soil and before there was any appearance of chlorophyll. It is very possible that the presence of enzymes and the availability of foods made possible by the conditions of germination may account for the difference of growth.

In the same way other reactions of plants in darkness may possibly be explained. For example, I have noticed the twining habit of several plants, as recorded by Noll. The sweet potato grows remarkably well in the dark and the etiolated stems begin to twine when they have attained a length of a meter or more. This phenomenon is also strongly marked in young shoots of *Falcata comosa* — a plant that is especially suitable to experimentation since it reaches a normal development in the laboratory where the light is often not of the best and shows striking contrasts with the etiolated plants. However, it should be remarked that these plants were exposed to an occasional illumination of the electric light for purposes of examination and watering. Several plants of *Falcata* that were grown this spring under a can in the dark room and not exposed to light were found, when finally examined, to have developed shoots that

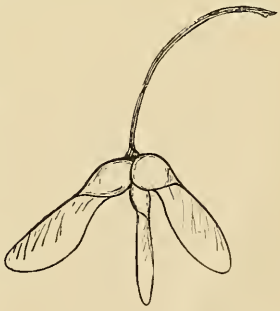
were not only decidedly more attenuated than those of the control plants and without any indication of curvature, but the stems had not the thickness of those uncovered plants that were grown beside them. While this experiment is not offered as an example of the loss of irritability, since the facts are too meager to warrant such a conclusion, it does show in connection with others that need not be mentioned, that occasional artificial illumination may have a pronounced influence upon the growth of etiolated plants. So it would appear that we must materially alter our conceptions, in many cases, at least, of the term etiolation if we mean by it the development that is possible in total darkness.

Columbia University.

SHORTER NOTES

A triple Samara in Acer rubrum. — The double samara of the maples is an almost constant feature, although in *Acer saccharinum* L. only one samara usually matures, which is doubtless an aid to their better flight.

The occurrence of a perfect mature triple samara in *Acer rubrum* L. seems worth recording. (The figure shown herewith is three quarters natural size.) A three-celled, three-lobed ovary is reversionary, and harks back to the days when the ancestral maples had a three or more celled ovary, and probably two ovules in each cell as they sometimes do now, conditions which usually obtain in the order Sapindales. There seems to have been a progressive reduction in these parts throughout the order, which is still going on, the bulk of the Sapindales being inconstant in these features. This reduction effects a great saving in vital energies and material. It may not be amiss to take a glance at what we know about *Acer* history.



Acer is essentially a Tertiary and modern genus, although a number of unmistakable samaras have been found in the Raritan

clays of New Jersey, besides a number of leaves in parallel horizons elsewhere. Fontaine even describes a leaf under the name *Acciphyllum* from the Potomac formation of Virginia, the affinity of which, however, is doubtful. The very abundantly preserved flora of the Dakota group contains no true species of *Acer*, although two species referred to *Acerites* have been described. Likewise the abundant flora of the Atane schists of Greenland contains no maples and the Cenomanian of Europe but one species, which is often considered doubtful, so that we may look upon the maples as a dawning type in the Cretaceous days that had long since seen the oak and tulip-tree, magnolia and holly, willow and poplar, sassafras and sycamore.

EDWARD W. BERRY.

PASSAIC, N. J., March 12, 1903.

REVIEWS

Two new elementary botanical Text-Books

Certainly the teachers of elementary botany cannot complain of the lack of text-books, nor on the whole, may the complaint be extended to their quality. And it is significant that the field covered by recently published works is common, and corresponds closely to the specifications published under the authority of the Society for Plant Morphology and Physiology, and accepted by the Examination Board of the Middle States and Maryland.

Two of the more recently published of these text-books are the "Introduction to Botany" by W. C. Stevens * and "Botany all the Year Round" by E. F. Andrews.† They are similar in scope and as no serious unfavorable criticism may be offered in regard to either, it is my chief purpose to point out the contrasts of treatment.

In the "Introduction to Botany" the approach to the subject is through the study of seeds and seedlings, a method in very general acceptance. The disadvantage of doing in this way becomes apparent in the study of the "grain" of Indian corn,

* Pp. v + 436 + 127 (Flora). Boston, D. C. Heath, 1902.

† Pp. 302. New York, American Book Company, 1903.

which is rather unsatisfactory, since by beginners it is easily mistaken for a seed. For this reason I have elsewhere advocated the use of other fruits together with their seeds. Some good physiological work on respiration and on food and its use, is introduced. The experiment on the responses of roots to the gravitational stimulus appears to be defective, the directions calling for the "hour-hand spindle," which revolves once in twelve hours — far too long a period, and much greater than the reaction time of the tap-root of the seeds used. Even the minute-hand spindle moves too slowly for good results. Ecological matters are then taken up. A similar plan is adopted for roots, buds, stems and leaves, and, while a fair amount of physiological work is called for, and many good points are brought in, the educational value of the whole is chiefly informational. There is not quite enough stress laid upon independent thought by the pupil, the text for the most part working out the problems. A chapter on "Growth and Movement" follows, which, though in many ways very good, is rather too difficult and technical for the average high school pupil. Sachs' experiment on hydrotropism, it may be said, is not the best in method that has been devised. The most striking part of the book is that concerned with the "flower," and a distinctly pleasant flavor is given to it by the reference to Sprengel's work, and by the good illustrations. The matter of historical allusion has, I believe, been entirely too much overlooked in elementary work. Stevens, and earlier, Bailey, in his "Lessons with Plants" (pp. 427 *et seq.*), have therefore done a service in using it. The introduction, too, of a critical study of insects in their relations to flowers, gives the subject a far more scientific trend than is usual. The following part of the book treats of types of all the leading groups of plants, and with general adaptation, and does not call for special mention. The chapter on "Plants of Past Ages" is brief, but good, and leads one to believe that the discussion might profitably be more prolonged and further illustrated.

The illustrations are evenly new and good — with isolated exceptions of no great moment — and the successful use of well-chosen photomicrographs — as *e. g.* of starch grains on pp. 20

and 21 — and of photographs, and this, too, without compelling the user of the book to carry around a heavy mass of clay-filled paper, is to be commended. The use of simple diagrams deserves similar praise. A flora completes the volume. Some chapters devoted to equipment and methods increase its usefulness.

In "Botany all the Year Round" the leaf is the starting point, the author finding that this is the most convenient on account of the availability of material, and because the leaf is so "important and fundamental" a part of the plant as to justify its use in this way. Fruits, seeds and seedlings, roots and underground stems, stems "proper," buds and branches, and the flower are taken up in the order named. The chief features of note are the practical questions and suggestions for field work which are so planned as to call for vigorous thought on the part of the student, and at the same time he will often gain thereby much useful information for practical living, as well as mental discipline. That the questions are sometimes unfortunate in their wording is a criticism which every teacher who has attempted to embody his method in writing will be loath to press. Aside from this, these questions and suggestions alone justify the book, and will make it a stimulating guide to study. The parts of the book on ecology and types — the latter especially — are too brief for the comfort of many teachers of elementary botany in the high school. The studies of types are a bit too desultory — at least such is the impression one gets — but withal there is relatively a considerable amount of effort by the pupil called for. The illustrations are for the chief part simple but good, some being the work of high school students. The whole represents the idea of a good, vigorous teacher. The book is thin and light, the paper exceptionally good and press work excellent. Indeed, the two books here briefly, and perhaps superficially, reviewed, are a demonstration that many publishers have missed the mark by a wide flight in making use of heavily calendered, stiff and badly odorous papers.—Francis E. Lloyd.

PROCEEDINGS OF THE CLUB

Wednesday, March 25, 1903

The meeting was held at the New York Botanical Garden; Dr. MacDougal in the chair; thirteen persons present.

The first paper of the announced program was by Mr. Harper, who discussed "Some Pines of the southeastern United States." In July, 1902, Mr. Harper spent a day at Ocilla, Georgia, where Dr. C. H. Herty of the Bureau of Forestry is carrying on investigations relating to the turpentine industry. An effort to determine the several forms of turpentine pines recognized by those engaged in this work led Mr. Harper to attempt a somewhat critical study of the diagnostic characters and distribution of the southern pines.

The best known of the turpentine trees is the long-leaf pine, *Pinus palustris* Miller (*P. australis* Michx.). This ranges from Virginia to Florida and Texas. In Georgia it is found on nearly every square mile of the coastal plain and extends some distance into the metamorphic region. It occurs on dry sandy soil, never being found in swamps, in spite of its specific name. It is readily distinguished by its long leaves and large cones.

The slash pine, another species used by the turpentine workers, is certainly the *Pinus Elliotti* Engelm., but probably not *P. Cubensis* Griseb. or *P. heterophylla* (Ell.) Sudw., two older names which have been associated with it. The species ranges from South Carolina to Mississippi, mostly near the coast, but extending 125 miles inland in Georgia. In contrast with *Pinus palustris*, the typical form is always found in moist situations, commonly in swamps, with *Taxodium*. It has much the same habit as *P. palustris*, but is distinguished by its shorter leaves, smaller, unarmed cones, and especially by its bark. The bark is difficult to describe but is very characteristic and when once known affords the best means of distinguishing the tree at a glance, as may often be done from a car window.

The so-called old-field slash pine occurs as second growth on dry soils in the coastal plain. It has not the characteristic form

or bark of *Pinus Elliotti* but its leaves and cones have the same characters and it is probably the same species. Some authors state that *Pinus Elliotti* is replacing *P. palustris* wherever the latter is cut away, but this does not seem to be the case to any appreciable extent in Georgia, where *P. palustris* reproduces itself freely.

Pinus heterophylla was originally described very briefly by Elliott as *Pinus Taeda* var. *heterophylla.* It is improbable that Elliott would have considered the slash pine, had he really known it, as a variety of *Pinus Taeda.* There is, however, a pine growing along the coast of Georgia, in situations like that described by Elliott for his variety *heterophylla*, which has much the appearance of *Pinus Taeda*, though probably entitled to specific distinction.

A pine which is sometimes chipped for turpentine, but fails to yield any, is *Pinus serotina* Michx., a comparatively little-known species. This ranges from North Carolina to Florida, occurring in sandy swamps. In Georgia, it is widely but sparsely distributed over the coastal plain, extending inland to within a few miles of the fall-line. Its cones are quite characteristic and remain on the tree for years, whence its name. It can be distinguished at a glance by its habit of sending out short branches all along the trunk, probably from adventitious buds.

Mr. Harper's paper was illustrated by photographs and specimens.

The second paper was by Dr. W. A. Murrill and was entitled "Remarks on some Generic Types among the Polyporaceae." Dr. Murrill gave a *résumé* of the treatment of the genus *Polyporus* and the family Polyporaceae by Micheli, Dillenius, Linnaeus, Adanson, Haller, Scopoli, Paulet, Palisot de Beauvois, Pollini, Fries, Gillet, Karsten, and others, discussing the historical types of *Polyporus*, *Agaricus*, *Favolus*, *Hexagona*, *Cyclomyces*, *Leuzites*, *Gloeophyllum*, *Fomes*, *Ganoderma*, *Elfvingia*, *Cryptoporus*, and *Pyropolyporus.* Some of the more striking characters of the genera were illustrated in an artificial key. The results of Dr. Murrill's studies among the Polyporaceae have recently been or soon will be published in the *Bulletin* of the Torrey Botanical

Club. The paper was illustrated by numerous specimens, some of which were obtained by Dr. Murrill in Sweden on the collecting grounds of Professor Elias Fries.

Mr. Nash exhibited two living plants from the conservatories, one a *Rhododendron* of a peculiar type, from Japan, known as *Rhododendron lincarifolium*, the other an *Atamosco*, of an undetermined species, from the Bahamas.

Dr. MacDougal announced that the Desert Botanical Laboratory of the Carnegie Institution is to be located on a hill near Tucson, Arizona, at a point having an elevation of about 3,100 feet above the sea. Photographs of the locality were shown.

MARSHALL A. HOWE,
Secretary pro tem.

TUESDAY, APRIL 14, 1903

The meeting was held at the College of Pharmacy; Rev. J. Henry Watson in the chair; nine presons present.

The paper of the evening was presented by Rev. L. H. Lighthipe. It was entitled "The Flora of the Pine-Barrens of New Jersey," and was illustrated by a large number of specimens.

The subject was introduced by a sketch of the pine-barren region which extends along the Atlantic coast immediately behind the coastal zone and is limited at the northwest by the Triassic formation, thus covering the Cretaceous and later geological formations.

The plants most characteristic of the region of pine-barrens were enumerated with reference to their general as well as local distribution. The ferns most common are: *Pteridium aquilinum*, *Woodwardia Virginica*, *W. areolata* and *Onoclea sensibilis*. *Schizaea pusilla* has been found only in New Jersey, Nova Scotia and Newfoundland. *Lygodium palmatum* is found in New Jersey only in a few places. Lycopodiaceae and Equisetaceae are common members of the flora.

Pinus rigida and *Pinus Virginiana* are common, while *Pinus echinata* is less often met with. In the swamps the white cedar, *Chamaecyparis thyoides*, is characteristic.

Large numbers of grasses, many of them of much value in binding together the sand, abound. *Andropogon*, *Uniola*, *Triodia*, *Stipa*, *Aristida*, *Panicum*, *Panicularia* and *Cenchrus* are largely represented. *Abama*, *Xerophyllum*, *Chamaelirium* and *Chrosperma* represent the Melanthaceae. *Lilium superbum*, *Aletris farinosa* and *A. aurea* are common Liliaceae.

Of the orchids, *Cypripedium acaule*, *Blephariglottis cristata*, *B. ciliaris*, *B. blephariglottis*, *Gymnadeniopsis clavellata*, *Pogonia ophioglossoides*, *P. divaricata*, *Arethusa bulbosa* and *Limodorum tuberosum* are usual.

The principal oak trees are *Quercus nigra*, *Q. coccinea*, *Q. Phellos*, *Q. minor*, *Q. prinoides*, *Q. nana* and *Q. digitata*. The "chinquapin," *Castanea pumila*, also occurs. The sweet-gum, *Liquidambar*, is a common tree; in the swamps *Magnolia glauca* is frequent.

Of the pink family, *Arenaria Caroliniana* is very abundant.

In ponds is found the water lily, *Castalia odorata*, associated with *Brasenia peltata;* also the yellow lotus, *Nelumbo lutea*, probably introduced from the west by the aborigines. In the marshes occur *Sarracenia purpurea*, *Drosera rotundifolia* and *D. intermedia*. *Drosera filiformis* is a true pine-barren plant.

The saxifrages show no peculiar plants, except *Itea Virginica*, which is also a pine-barren plant. The rose family here includes two common blackberries, *Rubus cuneifolius* and *R. hispidus*, and many wild roses.

The Papilionaceae are largely represented; among them, *Lupinus perennis*, *Trifolium arvense*, *T. agrarium*, *T. procumbens*, *Cracca Virginiana*, *Meibomia Marylandica*, *Lespedeza hirta*, *L. repens*, *L. angustifolia*, *Galactia regularis*, and species of *Phaseolus*, *Strophostyles*, *Apios* and other genera.

The milkwort species are *Polygala lutea*, *P. cruciata*, *P. brevifolia*, *P. incarnata*, *P. Mariana*, *P. Nuttallii* and *P. polygama*. *Corema Conradii* is found in the central part of the region and this is probably its southernmost abiding place.

Ilex glabra is the most usual holly tree. *Ascyrum stans* is a pine-barren St. John's-wort, but several other species are found. *Helianthemum Canadense* and about five species of *Lechea* com-

prise the ordinary plants of the family Cistaceae. *Viola pedata*, *V. Atlantica*, *Rhexia Mariana*, *R. Virginica* and *R. aristosa* are found. *Chamaenerion angustifolium* covers large spaces, also *Oenothera laciniata.*

The Ericaceae have such members as *Clethra alnifolia*, *Azalea nudiflora*, *A. viscosa*, *A. glauca*, *Kalmia angustifolia*, *Leucothoë*, *Pieris*, *Chamaedaphne*, *Xolisma ligustrina*, *Epigaea repens*, *Dendrium buxifolium* and *Gaultheria procumbens.*

The cranberries and the pyxie moss, *Pyxidanthera barbulata*, are found in suitable places. The gentians to be noted are *Bartonia Virginica* and *Gentiana Porphyrio*, as well as *Sabbatia* species. In the ponds with other water plants is found *Limnanthemum lacunosum.* *Asclepias* species abound. The Labiatae have such distinctive species as *Monarda punctata*, *Salvia lyrata* and *Scutellaria integrifolia.*

Lentibulariaceae are represented by *Utricularia cornuta*, *U. inflata*, *U. purpurea*, *U. subulata*, *U. intermedia* and *U. gibba.*

The Compositae are represented by about eight species of *Eupatorium*, two species of *Chrysopsis*, *Lacinaria graminifolia*, *Chondrophora*, *Sclerolepis uniflora*, *Solidago* and *Aster*, with a half dozen or more species each, and many others.

EUGENE SMITH,
Secretary pro tem.

NEWS ITEMS

Professor L. H. Bailey has been appointed director of the College of Agriculture of Cornell University.

Dr. Theodor Holm, of Washington, D. C., is spending a few weeks at the New York Botanical Garden, engaged in systematic studies on the Ranunculaceae.

Miss Anna Murray Vail, the librarian of the New York Botanical Garden, sailed for Europe on April 22, for the purpose of securing certain valuable books for the Garden library.

Mr. O. F. Cook, of the Bureau of Plant Industry, U. S. Department of Agriculture, has gone to Costa Rica with the intent of collecting data relative to the culture of bananas, coffee, and other tropical plants of economic importance.

Dr. Duncan S. Johnson and Mr. Forrest Shreve, of Johns Hopkins University, left Baltimore on April 8 for Jamaica, where they expect to collect materials for special botanical researches. Mr. William R. Maxon, of the U. S. National Herbarium, has recently joined Professor Underwood in Jamaica.

Professor F. S. Earle sailed for Porto Rico on May 9, commissioned by the Office of Experiment Stations of the U. S. Department of Agriculture, to make some special investigations on diseases of economic plants of the island. He has been granted a few weeks' leave of absence for this purpose by the New York Botanical Garden.

Teachers College, Columbia University, has secured control of an adjacent vacant lot, on which a school garden, under the direction of Professor Francis E. Lloyd, has been started. During the summer, a greenhouse, the gift of Mr. George Foster Peabody, will be erected on this plot.

The editor of TORREYA sailed from New York on May 9 for Porto Rico, expecting to devote about two months to making collections and field studies of the marine algae of that island. Contributions intended for publication in TORREYA may be addressed in the meantime to Dr. John Hendley Barnhart, N. Y. Botanical Garden, Bronx Park, New York City.

The Fourth Annual Meeting and Exhibition of the Horticultural Society of New York will be held at the New York Botanical Garden, Bronx Park, May 13 and 14. The exhibition will be held in the hall of the Museum Building, and will be open to the public from 1 until 6:30 P. M. on Wednesday, May 13, and from 10 A. M. until 5 P. M. on Thursday, May 14. At 4:25 P. M. on Wednesday, there will be an illustrated address by Mr. John K. L. M. Farquhar on "The Flowers, Fields, and Woods of Japan."

The program of the spring lectures at the New York Botanical Garden is as follows: April 18, "A Tour of American Deserts," by Dr. D. T. MacDougal; April 25, "The Vegetation of the Florida Keys," by Dr. M. A. Howe; May 2, "The Framework of Plants," by Dr. H. M. Richards; May 9, "Illustrations of Some Features of the West Indian Flora," by Dr. N. L. Britton; May 16, "The Food Supply of Young Plants," by Professor F. E. Lloyd; May 30, "The Color-Variations of Flowers," by C. C. Curtis; June 6, "The Streams, Lakes and Flowers of the Upper Delaware, and the Story of the Sundew," by Mr. Cornelius Van Brunt; June 13, "Vegetable Foods," by Dr. H. H. Rusby. The lectures are delivered in the auditorium of the Museum Building of the Garden, Bronx Park, on Saturdays, at 4:30 P. M.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–29 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–29 (1882–1902) are furnished at the published price of two dollars each; Vols. 28 and 29, three dollars each.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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THE TORREY BOTANICAL CLUB

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Matter for publication should be addressed to

MARSHALL A. HOWE
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Bronx Park, New York City

Vol. 3 No. 6

TORREYA

June, 1903

NOTES ON NEW MEXICO OAKS

By T. D. A. Cockerell

In Torreya, January, 1903, I recorded seven named forms of *Quercus* from Las Vegas Hot Springs. The material obtained agreed well with published accounts, and especially with the excellent figures given by Dr. Rydberg in Bull. N. Y. Bot. Gard., May, 1901. Whatever might be the value of these plants as species, it was evident that there were "points of relative stability" which were easily recognizable. On May 17, 1903, I visited all these oaks again, returning to the exact bushes whence I had my material of the year before. The new information thus obtained, together with the results of various observations at other times, lead me to some conclusions which seem worth recording.

The sides of Gallinas Cañon at Las Vegas Hot Springs slope towards the northeast and southwest. The slope facing southwest is more exposed to the winds than the other, but it also gets considerably more sun, and is dry and warm when the ground on the other side is still frozen. Here one would expect to see the oaks first leafing out, but the oak scrub on May 17 looked lifeless, without green, from a distance. On closer inspection some patches of green (*Q. Fendleri*) were seen at the lower levels, and it was observed that the other plants (*Q. undulata*, *Q. Rydbergiana* and *Q. grisea*) were leafing out, but the early leaves were inconspicuous because reddish. The opposite and colder slope, very differently, was largely covered with light green oak foliage, which proved to be *Q. Gambelii* and *Q. nites-*

[Vol. 3, No. 5, of Torreya, comprising pages 67–82, was issued May 12, 1903.]

cens, with some *Q. Fendleri*. At the lower levels *Q. Rydbergiana* and *Q. grisea* were also present. Of course the explanation of this distribution is found in the fact that the oaks of the *Gambelii* series belong to a colder climate and ordinarily to a higher altitude than those allied to *undulata*. On May 17 *Q. nitescens* and *Q. Gambelii* were practically over flowering, and *Q. Novomexicana* was coming into flower; while the *undulata* series (*i. e.*, all the other species) were in bud or little more advanced. I will now consider the species somewhat more in detail:

(A.) *Gambelii* Series

In the early leaf, the three forms are easily separated thus:

Lobes of leaf not at all bifid; general color light green with little red. *Q. Gambelii.*
Lobes of leaf (except towards base) bifid.
Young leaves very light green, narrower, deeply incised, hanging down. *Q. Novomexicana.*
Young leaves not so light, broader, not so deeply incised, not so pendulous. *Q. nitescens.*

Q. nitescens has the young shoots dark red, and the midribs of the leaves usually reddish, but the leaves glossy light green. *Q. Novomexicana* has the midribs green; the young leaves are quite grayish compared with the other two forms. *Q. Gambelii* has narrow pendulous leaves, but is easily distinguished from *Q. Novomexicana* by the characters already given. Altogether, the new evidence tends to substantiate the validity of these three species, about which I previously felt doubtful. Dr. Rydberg says the leaves of *Q. Novomexicana* are bright red when they unfold, but I am sure this could not have been the case with the plants I studied. I am strongly convinced that the pigmentation of oak-leaves varies to a great extend independently of the other characters, as DeVries so often found with the pigmentation of flowers.* Under these circumstances, the name must go with the leaf-form rather than with leaf-color.

(B.) *Undulata* Series.

Quercus undulata Torr. Leaves still very small, but as in all of this series except *Q. Fendleri*, some leaves of last year

* *Cf.* his statement: "The units of the specific characters are to be regarded and studied as sharply separated quantities." (Jour. Roy. Hort. Soc. 25: 243. 1901.)

still remained on the bushes, permitting certain identification. The color of the young leaves is pinkish-green, varying to dark reddish and light grayish, each bush being uniform or almost so. At one place clumps of the dark reddish and light grayish forms were growing close together, and close to them was a light green clump of *Q. Fendleri*, all three strongly contrasting. Dr. Rydberg speaks of the early leaves of *Q. Fendleri* as gray, but I did not find them so, though certain grayish forms referred to *Q. undulata* showed some approach to *Q. Fendleri*.

Quercus Fendleri Liebm. The light green leaves (the youngest sometimes pinkish) were usually better developed than those of other members of the series. If it were not so very common, one could imagine *Q. Fendleri* a hybrid between *Q. undulata* and *Q. Gambelii*.*

Quercus Emoryi Torr. The single clump which I referred to this species grows in front of the bath-house, and it certainly has relatively large leaves which agree with Rydberg's figure; it is also in stature more like *Q. Gambelii* than *Q. undulata*, etc. However, the genuine *Q. undulata* throws up vigorous shoots from the roots, which bear dark red, large leaves just like those of the supposed *Q. Emoryi*. My present impression is that the Hot Springs plant is really a form derived from *Q. undulata*, on the spot, and not genetically connected with *Q. Emoryi* of the south, though the latter probably had a similar origin. The leaves of my plant are full of small lenticular galls, not observed in the other forms. This refers of course to the leaves of last year; those of this year are pink, and only just out of bud. The clump, with its lifeless appearance, contrasts curiously with a lively green clump of *Q. Gambelii* close by.

Quercus grisea Liebm. This grows larger than most *Q. undulata*, and is late in coming out. The young leaves are pink. The form of the mature leaves varies from that of *Q. undulata* to that of *Q. grisea* on the same bush, though many bushes have all the leaves unmistakably *grisea*. I am decidedly of the opinion that *Q. grisea* is only a subspecies of *Q. undulata*.

* The known localities of *Q. Fendleri* are apparently those in which this might be possible, with the exception of Canadian River, Texas, where *Q. Gambelii* could hardly occur.

Quercus Rydbergiana Cockerell. The leaves are somewhat more advanced than those of *Q. grisea;* their color is always pink. After considerable study, I think this plant is (like *Q. grisea*) best regarded as a subspecies of *Q. undulata*, namely **Quercus undulata Rydbergiana,** notwithstanding differences in the leaves and fruit. All things considered, I do not feel perfectly assured that there is more than one valid species of the *undulata* group at Las Vegas Hot Springs, but since five easily recognizable types are undoubtedly present, it is proper that they should have names of some sort.

East Las Vegas, N. M.

A KEY TO THE NORTH AMERICAN SPECIES OF PANUS

By F. S. Earle

1.	Stipe excentric; pileus irregular.	2.
	Stipe lateral.	14.
	Stipe wanting; pileus sessile or resupinate.	20.
2.	Pileus squamulose, strigose or velutinous.	3.
	Pileus glabrous.	7.
3.	Pileus white.	4.
	Pileus colored.	6.
4.	Pileus infundibuliform, slightly velvety.	*P. Infundibulum* B. & C.*
	Pileus somewhat depressed, villous or strigose.	5.
5.	Pileus 7–8 cm., villous, whitish.	*P. levis* B. & C.
	Pileus 20 cm., strigose, whitish.	*P. strigosus* B. & C.
6.	Pileus cinnamon, becoming expellent, breaking into scales.	*P. conchatus* Fr.
	Pileus alutaceous, densely floccose-appressed, scaly.	*P. troglodytes* Fr.*
7.	Cespitose.	8.
	Not cespitose.	11.
8.	Stipe tomentose.	*P. connatus* Berk.*
	Stipe glabrous.	9.
9.	Lamellae free; pileus brown.	*P. Sullivantii* Mont.
	Lamellae decurrent or subdecurrent.	10.
10.	Pileus infundibuliform.	*P. concavus* Berk.*
	Pileus expanded-umbonate, yellow.	*P. illudens* (Schw.) Fr.
11.	Pileus convex to expanded.	12.
	Pileus becoming umbilicate or infundibuliform.	13.
12.	Stipe glabrous.	*P. Robinsonii* B. & Mont.
	Stipe fibrillose-striate.	*P. Cubensis* B. & C.*

* Known from tropical America only.

13.	Lamellae subdistant.	*P. torulosus* Fr.
	Lamellae densely crowded.	*P. cantherelloides* Mont.*
14.	Pileus squamulose, fibrillose or pruinose.	15.
	Pileus glabrous.	19.
15.	Pileus white or pale yellow.	16.
	Pileus brownish.	18.
16.	Pileus with a gelatinous upper stratum.	*P. angustatus* Berk.
	Pileus not gelatinous above.	17.
17.	Pileus white; lamellae white.	*P. Wrightii* B. & C.*
	Pileus pale yellow; lamellae fulvous.	*P. xylopodius* (Lev.) Fr.*
18.	Pileus tomentose, 5–7 cm., subsessile.	*P. alliaceus* B. & C.
	Pileus pruinose, becoming white when dry.	*P. dealbatus* Berk.
	Pileus furfuraceous, 2 cm.; stipe dilated above.	*P. stipticus* (Bull.) Fr.
19.	Pileus very glabrous; stipe dilated below; lamellae yellowish.	*P. stipticus gutturosus* Mont.
	Pileus glabrous; stipe merely a prolongation of the pileus, hairy at base.	*P. betulinus* Pk.
20.	Pileus tomentose or pulverulent.	21.
	Pileus glabrous, striate, cervinous, cespitose.	*P. eugrammus* (Mont.) Fr.*
21.	Lamellae covered by a veil when young.	*P. operculatus* B. & C.
	Lamellae not covered by a veil.	22.
22.	Pileus gray; lamellae dark ferruginous.	*P. salicinus* Pk.
	Pileus reddish; lamellae blackish-brown.	*P. nigrifolius* Pk.

Panus farinaceus Schum. of Ellis & Everhart's North American Fungi, No. 2502, is *Pleurotus atro-caeruleus griseus* Pk. Reg. Rept. **44**: 35.

New York Botanical Garden.

A NEW ARABIS FROM GEORGIA

By Roland M. Harper

In the summer of 1901 I collected in the coastal plain of Georgia a few fruiting specimens of an *Arabis* which seemed to be undescribed. Wishing to see more complete material, I turned some seed of it over to the New York Botanical Garden, and the plants growing from these seeds have just flowered for the first time. The species may now be characterized as follows, all of the description except that of the fruit being drawn from living specimens:

* Known from tropical America only.

Arabis Georgiana

Biennial. Stems erect, 3–5 dm. tall, with few erect branches mostly from the base, terete, purplish-tinged, minutely hirsute below, glabrous or nearly so above: basal leaves oblanceolate, coarsely toothed, 6–8 cm. long, forming a flat rosette; cauline leaves sessile, half-clasping by a cordate or subsagittate base, bright green on both surfaces, the lower surfaces and margins sparsely pubescent with both simple and forked hairs; the lower leaves oblong-lanceolate, coarsely toothed about the middle, about 5 cm. long, the upper much reduced and relatively narrower: racemes loose, terminal, becoming 3–4 dm. long in fruit: pedicels ascending (both in flower and fruit), becoming 1 cm. long at maturity, only the lowest subtended by bracts: sepals equal, ovate, acute, concave, narrowly scarious-margined, very sparsely pubescent with simple and forked hairs towards the tips, 4 mm. long: petals oblanceolate, obtuse, spreading above, 9–10 mm. long by 1.5 mm. wide, pure white: longer stamens 7 mm. long: style 1 mm. long, as thick as the ovary and stigma: pods narrowly linear, flattened, 1.5 mm. wide and 6–7 cm. long at maturity, erect or nearly so, the valves 1-nerved: seeds in a single row, brown, narrowly wing-margined.

This species seems most nearly related to *A. patens* Sull. and *A. hirsuta* (L.) Scop. (or its American representative), but differs from both in its longer pods. From the former it differs also in the glabrous upper surface of the leaves and upper portion of the stem, and in its erect pods; and from the latter in its larger flowers and evident style.

Collected in shady woods at the top of the high bank of the Chattahoochee River below Omaha, Stewart County, Georgia (in the Cretaceous region), on the afternoon of July 18, 1901 (no. 1091). Plants raised from seed in New York were in full flower at the end of April, 1903.

This seems to be the first *Arabis* reported from the coastal plain of the eastern United States, with the exception of *A. Virginica* (L.) Trel. (*A. Ludoviciana* Meyer), which, however, is only a weed in the coastal plain, and, besides, has been regarded by many authors as belonging to another genus.

College Point, N. Y.

A SECOND ILLINOIS STATION FOR PHACELIA COVILLEI WATSON

By H. A. Gleason

Mr. E. S. G. Titus, field assistant to the Illinois state entomologist, has recently referred to me for determination a plant which proves to be *Phacelia Covillei* Watson. In view of the apparent rarity of the species, a note upon it may be of interest. The original station for this plant was an island in the Potomac River, where it was first collected by F. V. Coville. Although lost sight of for some years, it has again been collected near the place of its discovery. Dr. J. Schneck of Mt. Carmel, Illinois, has reported * a second station in southern Illinois, where it occurs in the bottom-lands of the Wabash River.

The new station for it is at Fall Creek, a small town in western Illinois near Quincy, and about two hundred miles from the first Illinois station at Mt. Carmel. Here it grows along a railroad track in the cleared bottom-lands of the Mississippi River, but about four miles from the river itself. Mr. Titus is of the opinion that the soil is liable to inundation, which, if correct, would correspond with the observations of Dr. Schneck concerning its habitat at Mt. Carmel.

Dr. Schneck has spoken of the similarity of the plant to *Macrocalyx Nyctelea* (L.) Kuntze, and has surmised that it is confused with the *Macrocalyx* by other collectors. The resemblance to the latter in the specimens from Fall Creek is striking, and they were at first considered by Mr. Titus identical with the *Macrocalyx*, which was growing near by. The plants of the *Phacelia*, while somewhat smaller and less succulent, are distinguished by the imbricated corolla-lobes, and the structure of the capsule.

Phacelia Covillei was regarded by Dr. Schneck as an austroriparian plant, and the limited evidence at hand concerning its habitat and distribution justifies this conclusion. The station at Fall Creek, while distant from the characteristically austroriparian region about the valleys of the lower Wabash and the lower Ohio, is still not entirely beyond the influence of austro-

* Bot. Gaz. 27 : 395. 1899.

riparian conditions, as is shown by the presence in the flora of the Mississippi and Illinois valleys of numerous southern species which extend north as far as Keokuk and Peoria.

URBANA, ILL.

SHORTER NOTES

LYCOPODIUM CERNUUM IN GEORGIA.—While walking from Cuthbert to Fort Gaines, Georgia, on October 28, 1902, I was surprised to find that curious tropical club-moss *Lycopodium cernuum* L., growing in springy places along the sides of several railroad cuts southwest of Coleman. It was fairly abundant, and though the specimens were rather small (none over a foot in height), many of them were fruiting. As the occurrence of the plant in this manner was of little or no significance from a phytogeographical standpoint, I sought at once to determine its natural habitat, and many promising-looking localities along the railroad for the next few miles were explored, but without success. So how this species came to adopt such an artificial habitat, so remote from any place where it is known to grow naturally, is still a mystery. This branch of the railroad has been in existence for many years, but the country traversed by it is still sparsely settled.

Lycopodium cernuum does not seem to have been previously reported north of latitude 31°, and it is possible that its native range may be confined to still narrower limits.

ROLAND M. HARPER.

A NEW SPECIES OF URERA. — **Urera magna** sp. nov. Woody, the stem 5 cm. in diameter or more, reclining on bushes, unarmed or nearly so: leaves ovate-orbicular, short-pubescent beneath, especially on the veins and veinlets, puberulent, and with some solitary longer hairs above, the petiole 16 cm. long or less, the larger blades 3 dm. long by 2.5 dm. wide, sharply dentate-serrate, the apex rather abruptly acuminate, with a narrow tip about 2 cm. long; base of the blade cordate; primary veins about 7 on each side: cymes numerous, about 8 cm. broad; ultimate pedicels about 2 mm. long: fruit white, oblong-elliptic, 4 mm. long by 2.5 mm. thick, the achene wholly included.

In a forest ravine, Wingfield Estate, St. Kitts, B. W. I., N. L. Britton and J. F. Cowell, September, 1901, no. 457. Professor Urban would include this plant in *U. Caracasana* (Jacq.) Gaud., but a comparison with numerous specimens of this plant from northern South America, and an examination of Jacquin's figures of *Urtica Caracasana*, in Hort. Schoenbr. *pl. 386* indicates to me that it cannot properly be so referred, and I therefore venture to describe it as above. N. L. Britton.

PROCEEDINGS OF THE CLUB

Wednesday, April 29, 1903

The meeting was held at the New York Botanical Garden with Dr. MacDougal in the chair. Twenty-five persons were present.

The minutes for the two previous meetings were read and approved.

Miss M. A. Parker, 797 Madison Avenue, New York City, and Mr. Macy Carhart, Keyport, N. J., having been duly nominated and the nominations being approved by the committee on admissions, were elected as members of the Club.

Dr. Marshall A. Howe proposed the name of Mr. Homer D. House, of Columbia University, for membership; referred to the committee on admissions.

The resignation of Miss A. May Palmer as a member of the club, having been approved by the treasurer, was accepted.

A letter was read from Mr. M. P. Rich announcing the death of his brother, Dr. Jacob M. Rich. Dr. Rich had long been an honored member of the club and on motion the secretary was instructed to write Mr. Rich, expressing the sympathy of the members of the club and their sense of the great loss sustained.

A letter from Mr. Roland M. Harper was read, asking the club to endorse his application to the Scientific Alliance of New York for a grant of $150.00 from the Herrman Fund, for the purpose of continuing his phytogeographical explorations in the coastal plain of Georgia and adjacent territory with a view to completing the material necessary for publishing a flora of that

region. On motion the application was endorsed as requested, and ordered forwarded to the secretary of the Scientific Alliance.

The first paper of the scientific program was by Dr. W. A. Cannon, "Notes on the Vegetation of Roan Mountain." It was illustrated by numerous herbarium specimens and by a blackboard chart of the region showing the position and relative size of the different plant formations. Of these the author recognizes four: First, the deciduous forests, occupying the lower slopes of the mountains; second, the coniferous forests, balsam and spruce, mostly confined to northern exposures at an elevation of 5,500 feet and above; third, the frutescent or shrub formation lying above the conifers and occupying part of the higher summits; and fourth, the meadows or "balds" covered with grasses and herbaceous plants that occupy the remainder of the high summits.

Roan mountain is situated in extreme western North Carolina, between the Blue Ridge and the Great Smoky Mountains. Its highest elevation is 6,400 feet. It seems to be a meeting place for mists and storms, the summit being veiled in masses of clouds for a considerable part of the time. During the summer of Dr. Cannon's stay on the mountain, there were only eleven entirely clear days during July and but seven during August. This ensures a very moist atmosphere and a cool comparatively even temperature, the average daily range being only 15°. These conditions seem particularly favorable to plant growth, since none of the dwarfing effect on vegetation usually found at high altitudes was observed except on a few areas of very sterile soil. As a rule the plants were as large and vigorous as those found at lower levels.

Extensive lists of the plants characteristic of the different formations were given. It was noted that the rare Gray's lily has become almost extinct and that only a few scattered clumps remain of the local *Sedum Roanense*.

The second paper was by S. H. Burnham, entitled "Observations on Some of the Plants of the Yosemite Valley and Vicinity." The author described a vacation camping trip undertaken by himself and four others, during the summer of 1894. Starting from Stanford University, they crossed parts of the

Coast Range, the great Central San Joaquin Valley and those portions of the Sierra Nevadas in the neighborhood of the big tree groves and the Yosemite Valley. Herbarium specimens illustrating the flora of the different regions traversed were exhibited and detailed descriptions of the different groves of big trees were given. Four distinct forest belts were observed in the Sierra Nevadas. On the higher foothills and up to 3,000 feet, the "digger pine," *Quercus Californica* and *Aesculus Californica* were the prevailing trees. From 3,000 feet to 6,000 feet are found the groves of big trees, *Sequoia Washingtonia* and the Douglass spruce, *Pseudotsuga mucronata*. From 7,000 to 9,000 feet, occur *Picea grandis* and *Pinus contorta*, and above 9,000 feet are *Pinus albicans* and *Pinus aristata*.

Dr. H. J. Webber, of the Bureau of Plant Industry of the Department of Agriculture, was present, and, at the request of the Chairman, he consented to tell briefly of some of the work being done at the Laboratory for Plant Breeding, of which he is in charge. He stated that at Washington, practical problems were considered paramount and those of scientific interest only were given secondary consideration. As illustrating the kind of work that is being undertaken, he took the case of cotton. This is by far the most important crop for most of the Southern states. The ordinary upland varieties have a short staple averaging only three fourths of an inch in length and a green woolly seed that can only be removed by the use of the saw gin. On certain limited areas near the coast, a sea-island cotton is grown having a very fine fiber nearly two and a half inches long and a smooth black seed that can be removed by a roller gin that does not injure the staple. This is the finest cotton in the world, but the boll is small and hard, making it hard to pick, the yield is light, and the plant does not succeed on ordinary uplands. Numerous crosses have been made in the hope of securing a cotton with the long staple and smooth seeds of the sea-island combined with the big round bolls, and the hardiness and productiveness of the upland kinds. Out of over sixty thousand hybrids that have been produced, twelve have been found that approach this ideal type, and the effort is being made by continued selection to fix

these desirable qualities. The results so far attained justify the hope that in a few years more this may be accomplished. The general planting of such an improved variety would mean great good to the entire community since it would assure better prices for the grower and vastly better and more durable fabrics for the consumer. Equally important problems confront the plant breeder for each of the chief agricultural crops, and the laboratory could profitably employ fifty investigators instead of the seven who are now engaged in the work.

Mr. F. S. Earle exhibited plants of the common garden Nasturtium (*Tropaeolum*) that had grown in a box in the window of a living-room during the winter. Dry air and the occasional escape of coal-gas from the stove made the conditions so unfavorable that growth had been feeble and the leaves and petioles had developed a dense coating of rigid white septate hairs. The coating was so pronounced as to make the leaves look as if covered with mildew. When grown under normal conditions the very young leaves show a few scattered hairs as they first unfold, but these at once drop away leaving the plant entirely glabrous.

Mr. R. M. Harper exhibited a flowering plant from the propagating houses of a large *Arabis* grown from seeds collected in southern Georgia. It differs so markedly from any of the known plants of that region that he considers that it is probably a new species.

There being no further business, adjournment followed.

F. S. Earle,
Secretary.

Tuesday, May 12, 1903

The meeting was held at the College of Pharmacy; Dr. H. H. Rusby in the chair.

The minutes of the preceding meeting were read and approved.

Dr. H. D. House, of Columbia University, was elected to active membership.

It was announced that the following persons had been selected by the President to constitute the Field Committee: Eugene Smith, Chairman; George V. Nash, Miss Marie L. Sanial, Miss L. K. Lawall, Edward W. Berry.

The Treasurer's report for the year ending January 14, 1903, was read. It showed receipts amounting to $2,891.74 (not including $67.60 from the former treasurer) and a balance on hand of $327.33. The report was adopted.

The first paper on the scientific programme was by Miss E. M. Kupfer, entitled "Remarks on regeneration in the cuttings of plants." The results of Miss Kupfer's experiments, which were carried on at the New York Botanical Garden, may be outlined as follows:

Baccharis genistelloides, a South American xerophyte devoid of leaves, produced both from lateral buds and at the tip of the main shoot, stems almost without wings and with several well-marked reversion leaves.

In cuttings of *Muehlenbeckia platyclados*, in addition to flat septate branches identical with normal ones except in the production of large hastate leaves, there were developed also one or more perfectly cylindrical leaf-bearing shoots. As the cylindrical branches flattened, the leaves decreased in size. Removing leaves or growing points on these cuttings, induced the appearance of leaves at nodes from which they had previously been absent.

Russelia juncea and *Cytisus purgans*, both normally leafless, produced conspicuous leaves before taking root.

A blade proportionally three times as large as usual was induced on the thorny petioles of two cuttings of *Rubus australis* which took several months longer than the others to start growth.

Sambucus Canadensis produced on cuttings of the first year only entire, bifoliate or trifoliate leaves. In the second season, some leaves had four or five leaflets and none more than five.

Colletia cruciata showed remarkable regressive series from leafless thorns to finely pointed normally leafy branches. On some cuttings a double series, first regressive and then again progressive, appeared. One plant which did not start growth until fully seven months after the others produced a branch totally without thorns, but with unusually conspicuous leaves.

The various theories of regeneration were discussed, and it was pointed out that none so far advanced seemed to cover all of the facts presented. It was suggested that there might be some

connection between the rapidity of regeneration and the character of the organ produced.

Dr. P. A. Rydberg gave the second paper, which was on "Some generic segregates." This is soon to be published in the *Bulletin*.

Both papers were discussed at some length by several members of the club.

W. A. Cannon,
Secretary pro tem.

NEWS ITEMS

Dr. Arthur Hollick recently started for the Yukon region, to make a study of its fossil flora. His route is overland from Skagway to Dawson, thence down the Yukon river to its mouth, with brief stops at points where it is desired to carry on special investigations. This work has been undertaken in connection with the United States Geological Survey.

Professor L. M. Underwood, who has been engaged in field study in Jamaica and Cuba since January, and who had intended to go by direct steamer from the West Indies to England, surprised his family and friends by returning to New York about the middle of May. He sailed for Europe June 6, and intends to spend the summer in England and on the Continent.

The Wild Flower Preservation Society of America held a meeting under the auspices of the Olivia and Caroline Phelps Stokes Fund for the Protection of Native Plants in the museum building of the New York Botanical Garden, Saturday evening, May 16, 1903. Mr. Charles Louis Pollard, of the United States National Museum, delivered an illustrated lecture on "Vanishing Wild Flowers."

Mr. John A. Shafer, Custodian in Botany of the Carnegie Museum at Pittsburgh, who accompanied Dr. and Mrs. Britton to Cuba in March, and remained there after they returned, has reached home. He made extensive collections in the provinces of Havana and Pinar del Rio, and spent some days working upon them at the New York Botanical Garden before returning to Pittsburgh.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–29 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–29 (1882–1902) are furnished at the published price of two dollars each; Vols. 28 and 29, three dollars each.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

THE TORREY BOTANICAL CLUB
Columbia University
NEW YORK CITY

Vol. 3 July, 1903 No. 6

TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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Matter for publication should be addressed to

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New York Botanical Garden
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Vol. 3 No. 7

TORREYA

July, 1903

A NEW AND CHEAP FORM OF AUXANOMETER

By F. E. Lloyd

It is very much more interesting and instructive, in elementary courses in botany, to observe periodicity of growth in plants than merely to demonstrate, by means of a lever, what every one knows already, namely, that plants grow. It is sounder pedagogically to do such experiments quantitatively, since, when so performed, they mean very much more in training. It is for this reason that attempts have been made to construct a cheap form of auxanometer by attaching a recording cylinder to the minute-hand spindle of an ordinary clock. It is obvious, however, that the centering of a cylinder, and its vertical adjustment without lateral movement, are by no means easy of accomplishment. A cylinder is very likely to revolve irregularly unless made with very great care, a process which involves turning and centering on a lathe, and skilful mechanical adjustment to the clock. I have to confess to failure in this direction, except after a too great expenditure of time and labor. Happily, however, this experience has led me to devise a very cheap and accurate mechanism which accomplishes the end desired, and this at a very small cost of money, time or skill. This is done by substituting for a revolving cylinder, a lever, which is jogged once an hour by an arm moved by the minute-spindle of a seventy-five cent clock.

As will be seen by the illustration, the lever bearing the record is fixed on a horizontal axis, and stands vertically upwards, held against a block by means of a thread, reeved through a wire pulley, drawn sufficiently taut by means of an attached weight. This weight must be heavy enough to draw back the record

[Vol. 3, No. 6, of Torreya, comprising pages 83–96, was issued June 12, 1903.]

lever to the block when it has been displaced from the vertical, say from 0.5 to 1.5 cm., according to the length of the lever and of the record. The arrangement of thread and weight was chosen because, with a little adjustment, the lever may thereby be pulled back quietly and quickly without shock or vibration, after it has been moved by the minute-spindle arm. To set up such an apparatus one may proceed as follows: Take a box, a wooden packing- or mailing-box of suitable size, say approximately a cube, 15–20 cm. on a side, fill it with gravel and nail it up. This makes a good, solid stand. Its solidity is enhanced by gluing on the under side as feet, three bits of thin cork. Upon

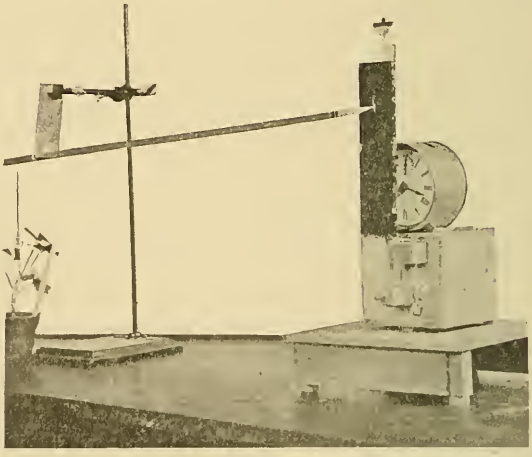

Fig. 1.

the top of this stand is affixed a cheap clock from which the glass face has been removed. Its minute-hand must be suitably bent in an L, or in its place an L-shaped arm affixed to the spindle, so that during its rotation, it will move against a shoulder or pin on the record lever. This lever is a wooden arm on an axis attached to the side of the stand below the clock. A little care must be given to adjusting the axis — a wire nail serves very well — so as to avoid any lateral shake. The shoulder or pin upon which the minute-spindle arm plays should be arranged so that the record lever will be moved but a little distance, and then be released. It will then be drawn quickly

back to its vertical resting position against the wooden block. It is plain that the recording point of the auxanometric lever itself, which is attached to a growing plant, will make a horizontal mark, if allowed to drag across a sheet fixed to the lever arm, or exactly speaking, an arc of a large circle. Since the end of the lever, attached to the plant, is constantly falling as the plant grows, it is obvious that the distance between these marks, which will be made at hourly intervals, will show a record of the growth, amplified of course, in the ratio of the lever arms. The chief difficulty, and this is but a slight one, is in getting the planes of the two levers sufficiently parallel, so that the record-

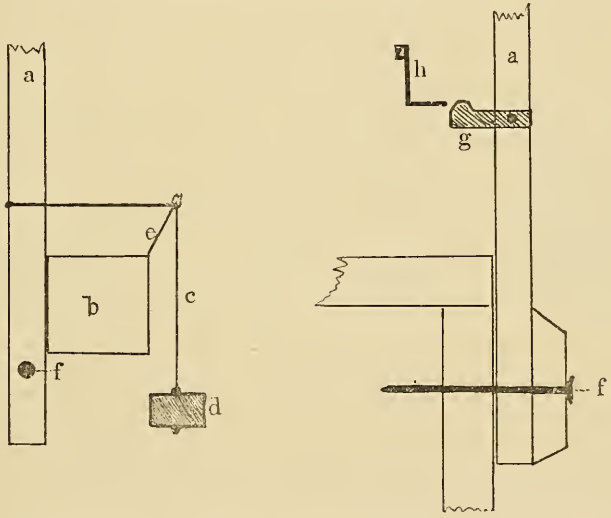

FIG. 2. Sketch to show details of lever-mechanism. *a*, lever, carrying record; *b*, wooden block; *c*, thread, to which is attached weight, *d*, and which moves through bent wire pulley, *e*; *f*, pivot; *g*, shoulder on which the arm attached to minute-hand spindle, *h*, impinges; if the latter is bent once more at right angles, the shoulder, *g*, need be but a simple pin. The arm, *h*, is displaced to one side to make the drawing clearer.

ing point will work freely and at the same time not swing away from the surface on which the record is to be made. When this trifling obstacle has been overcome, one has a piece of apparatus which will give a beautifully exact and clear record of hour intervals of growth. It will readily be seen that half-hour intervals may be obtained by having a double arm or by placing two

shoulders or pins on the record lever in the proper positions. Such brief intervals are, however, hardly useful except in special cases.

The auxanometric lever should work easily and smoothly, and truly in a vertical plane. This may be accomplished in a manner devised by Professor Herbert M. Richards, who kindly allows me to incorporate the idea in this paper. A U-shaped piece of metal is cut out, and the ends of the legs are bent to a J-form. These serve as beds for pieces of capillary, or very heavy-walled, glass tubing which function as "hole-jewels" for the pivot of the recording lever. This pivot may be made of a thinnish needle, preferably a long one. Placing the "hole jewels" on the pivot, they are bedded into the J-shaped arms by means of shellac or, better, sealing-wax, and adjusted so as to give as little end-shake to the lever as will allow it to work freely. The lever and its support are then a simple piece of apparatus which may be held in place by means of a clamp. The clamp may be easily improvised, a gravel-filled box or bottle serving as a foot, or a retort stand may be used.

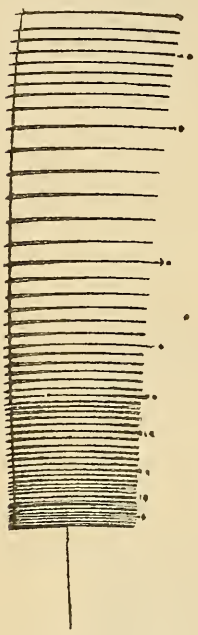

FIG. 3. Record of growth of *Vicia Faba* seedling. The dots opposite the marks indicate six-hour intervals, beginning at 6 P. M., May 14, 1903. The decrease and irregularity in growth after the first 24 hours was due to unfavorable conditions.

The recording pen is very satisfactory if made of sheet celluloid, which may be appropriately bent so as to scratch lightly on smoked paper or mica, attached to the lever actuated by the arm on the clock. Mica is especially good because it does not warp if carefully smoked and may be used in making sun-prints. The record reproduced in the accompanying figure was made in such a way. Some pieces of bent tin serve to make a holder for the recording surface or it may be attached simply by thumb tacks.

A NEW ALETRIS FROM FLORIDA

By George V. Nash

This, the fourth species of this genus growing within the confines of the United States, was found in the pine lands in the vicinity of Jacksonville, Fla., by Dr. Small and the writer in the fall of 1901, and at present is known only from that section. Its habitat is similar to that of the other species, and its manner of growth the same. The clusters of elliptic light green leaves grow singly or in tufts, and it was in this condition that it was collected and brought to the New York Botanical Garden, where it has since been growing among the temperate collections in the conservatories. At the time of collection we were under the impression that we had secured sterile plants of one of the three species already known, and it was not until it flowered in June of this year that this impression was dispelled. I have seen two of the other three species growing, and as soon as this one came into flower I was sure it was new. Its perianth more nearly approaches that of *A. aurea* Walt., but in that species the flower is yellow and the segments of the perianth longitudinally crested. This new species has the mouth of the perianth more contracted than in any of the others, giving it a distinctly obovate shape, the character suggesting its specific name.

Of the three species, other than this, the more common is *A. farinosa* L., which has a white cylindric perianth. This has an extended range, growing from Maine to Ontario and Minnesota, south to Tennessee and Florida and west to Louisiana. *A. aurea*, already referred to, is more restricted as to its northern extension, but ranges along the gulf coast as far as Texas; it is also reported from southern New Jersey. The second yellow-flowered species, *A. lutea* Small, is much more confined, extending no further north than Florida, and only west as far as Mississippi. It was collected by the writer in 1894 in central peninsular Florida, in the neighborhood of Eustis, Lake Co., where it is quite common, and was distributed by him as *A. aurea*, from which it differs in having a cylindric perianth instead of a campanulate or oblong-globose one.

There are then, it will be seen from the above, two species with cylindric perianths, one white and the other yellow, and likewise one each, white and yellow, with a much broader perianth, ranging from campanulate to obovate.

It may be interesting to note that this small genus, comprising about ten species, has had a most restless career, so far as its family relationship is concerned. It has been placed in the Haemodoraceae, Amaryllidaceae, and the Liliaceae; in the first one by no less an authority than Bentham and Hooker and in the last by as great and more recent an authority, Engler and Prantl, who make it the sole genus of a single tribe in that family.

In addition to the four species known from the United States, there are six species in eastern Asia, extending from Japan to Borneo, so that for a genus so small in numbers it covers a rather extended territory.

A detailed description of the new species follows:

Aletris obovata. — A tufted perennial with long slender stems and inflorescence and obovate white perianth. Stems 5–7 dm. tall, striately ridged, leafy: leaves sessile, the basal narrowly elliptic to obovate-lanceolate, narrowed at the base, acute at the apex, glabrous, 6–8 cm. long, 1–2 cm. wide, 9–11-nerved, bordered by a narrow translucent margin, abruptly passing into the bract-like leaves of the stem which are lanceolate and 1.5 cm. long or less: inflorescence 2–4 dm. long, slender: flowers numerous, spreading, on pedicels about 2 mm. long which are subtended by two bracts: perianth obovate, 6–7 mm. long and about 5 mm. in diameter, white, rugose, 6-angled, the angles rounded, the segments united for about three fourths their length, the free portion incurved, the tips of the outer ones greenish: stamens adnate to the perianth for a little more than one half their length, the filaments glabrous, the free portion subulate and diverging, the anthers cinnabar: ovary ovate-conic.

Collected in pine land, Jacksonville, Fla., by Nash & Small, November, 1901, no. 381, living plants only, and neither in fruit nor flower. Flowered at the conservatories of the New York Botanical Garden in June, 1903.

New York Botanical Garden.

TWO NEW CARLUDOVICAS FROM THE ISLAND OF ST. KITTS, WEST INDIES

By J. F. Cowell

The two Carludovicas collected on the island of St. Kitts in the fall of 1901 seem to be undescribed, and, so far as is now known, confined to that island; both are quite distinct from any hitherto found in the West Indies. One of them (No. 164) is remarkable for its high-climbing habit and free branching, and, as seen in the deep mountain ravines, using the trunks of tall ferns and other trees as a means of support, is a very striking plant; so strong is its adhesion to the trees by means of its long rope-like roots that it takes great force to detach the plant, and it forms a good ladder for the ascent of the trees; in some cases the stems were 25 to 30 feet long with branches at least 6 feet long.

The other species (No. 326) was found only at the bottom of one ravine, growing in dense shade at an elevation of about 1,500 feet above the sea; with its sturdy growth and abundant dark green leaves it is one of the most beautiful of the genus.

Carludovica scandens sp. nov. Caudex 3–4 cm. thick, climbing on trees to a height of about 8 m., often branching. Leaves several at the summit; petiole very short, not exceeding 1 cm. in length; blade 6–7 dm. long, rather more than 2 dm. wide, not rigid, bright green on both sides, cleft to about the middle, the lobes oblong-lanceolate, acutish, not acuminate, the midvein not very prominent, the lateral veins about 10 on each side: peduncles stout, erect or ascending, 7–8 cm. long, slightly compressed, bearing 4 or 5 bracts, the bracts membranous, lanceolate, pale green, acuminate, 6–8 cm. long: spadix cylindric, blunt, 4–5 cm. long, about 1.8 cm. thick; fruiting perigonia irregularly 5-sided, about 1 cm. broad, the 4 stigmas elevated above the surface, forming a cross.

In the forest, Buckley Estate, St. Kitts, B. W. I. (Britton and Cowell, Sept. 10, 1901, No. 164).

Carludovica Caribaea sp. nov. Terrestrial; caudex short, stout, 5–6 dm. high. Leaves several at the top, dark green on both sides but slightly paler beneath than above, thin, not rigid; petiole about 5 cm. long; blades cuneate-obovate in outline,

very slightly wavy-margined, 7–8 dm. long, 3–4 dm. wide, cleft to about one third their length from the apex, the midvein rather prominent, the lateral veins about 14 on each side, the lobes ovate, acuminate: peduncle stout, 6–8 cm. long, erect, bearing 3 or 4 bracts: spadix 7–9 cm. long, 3–4 cm. in diameter, cylindric, but a little narrower toward the summit than below, blunt; fruiting perigonium 4-angled, rather more than 1 cm. wide, with 4 ridges opposite the angles raised above the 4 separate pitted pistils.

In a forest ravine, Molyneaux Estate, St. Kitts, B. W. L. (Britton and Cowell, Sept. 13, 1901, no. 326).

SHORTER NOTES

Plants new to Vermont found in Burlington and Vicinity.* — The following species have been found or recognized since the publication of the "Flora of Vermont" in 1900:

Corallorhiza striata Lindl. Found some fifty years ago by President Torrey probably in Burlington, but supposed to be *C. multiflora* Nutt. until determined by M. L. Fernald in 1902.

Oxycoccus Oxycoccus (L.) MacM., var. *intermedia* Fernald. Found by Oakes in Colchester, probably at Ft. Ethan Allen Pond, a good many years ago. See Rhodora, 4: 231.

Lolium temulentum L. Found by Professor L. R. Jones on the University of Vermont campus but not determined as *L. temulentum* till 1901. Found also by Rev. Levi Wild at Essex Junction.

Physalis Peruviana L.

Rumex salicifolius Weinm. One plant found at Ft. Ethan Allen, 1899.

Ranunculus sceleratus L. A few plants were found in Colchester in 1901. In 1902 it was found in abundance in lumber yards in Burlington.

Galium boreale L. A good sized colony in edge of woods back of the University.

The following five species were collected in 1902:

* Abstract of a paper read at the eighth winter meeting of the Vermont Botanical Club, January 17, 1903.

Pogonia affinis Austin. One plant found by Mrs. Henry Holt, in Burlington.

Cicer arietinum L. One plant found on railroad embankment in Colchester. Determined by Professor L. R. Jones.

Collomia linearis Nutt. Two plants found near Malted Cereal Co.'s mill in Burlington.

Lamium album L. Escaped to roadside in Essex.

Hedeoma hispida Pursh. Found in Burlington by F. M. Hollister.

NELLIE F. FLYNN.
BURLINGTON, VERMONT.

A NEW LIPPIA FROM PORTO RICO. — **Lippia Helleri** sp. nov. A weak shrub, 1.2–1.7 m. high, with slender flexuous pubescent branches. Leaves obovate, 1 cm. long or less, opposite, dull green, puberulent and resinous on both sides, obtuse, crenate, cuneate or narrowed at the base, the slender petiole about one fourth as long as the blade: flower-heads axillary, about 8 mm. broad, slender-peduncled, the peduncles 3–5 mm. long, puberulent: bracts of the involucre broadly oblong, obtuse, puberulent, ciliate, about 2 mm. long: calyx about one third as long as the corolla-tube, 2-toothed, pubescent: corolla-tube slightly enlarged upward, the limb 2-lipped, the lower lip with a broad middle lobe and 2 smaller lateral ones, the upper lip 2-lobed, all the lobes obtuse; corolla white, tinged with pale purple.

In thicket, near Bayamon, Porto Rico, April 29, 1899 (Heller, no. 1238). Near *L. micromera* Schauer, and suspected by Professor Urban to be a cultivated form of that species, but the collector's field notes do not indicate this as probable, and the characters of leaves and of corolla are very different. N. L. BRITTON.

A NEW WALTHERIA FROM THE BAHAMAS. — **Waltheria Bahamensis** sp. nov. Branched from the base, lepidote, the slender branches 6 dm. long or less. Leaves small, broadly oblong or ovate-oblong, sharply dentate, strongly veined, 1–2 cm. long, 1.5 cm. wide or less, dark green above, paler beneath, lepidote on both surfaces, the apex obtuse, the base obtuse or slightly cordate; petiole slender, half as long as the blade or less: flower clusters sessile or nearly so in the axils, dense, less than 1 cm. in diameter: calyx narrow: bractlets sharply toothed, the teeth triangular-ovate, acute or acuminate, nearly half as long as the tube: petals spatulate, thin, 3–5 mm. long, obtuse or slightly notched, 3 of them sometimes longer than the other 2: filaments

all united into a tube, bearing the 5 sessile anthers: ovary stellate-hairy above.

Near Nassau, New Providence, Bahama Islands, A. H. Curtiss, March 13, 1903, No. 117 (type). Also collected at the same place by Dr. and Mrs. Northrop, January 25, 1890, No. 207. In the account of the collections made by herself and her lamented husband (Mem. Torr. Club, 12: 51) Mrs. Northrop remarks on the differences between this plant and the widely distributed *Waltheria Americana*. N. L. Britton.

Elliottia racemosa again.—This afternoon at the base of the sand-hills (and therefore at the edge of the swamp) of Turnpike Creek in this (Telfair) county, about six miles from here, I found about twenty specimens of *Elliottia racemosa*, that rare Ericaceous shrub which was recently supposed to be extinct. The largest specimen was about ten feet tall. The plants were almost past flowering, but showed no indications of producing fruit this year, though the flowers were being visited by several kinds of insects, mostly bumblebees. But on one plant I found a single empty globose four-valved somewhat irregular capsule about 5 mm. in diameter, probably of last year's crop. Care will be taken to preserve this the only fruit of *Elliottia* on record.

Elliottia has now been reported from at least six counties in the coastal plain of Georgia (see Plant World, May, 1902, and March, 1903), of which Telfair is the most southwestern.

Roland M. Harper.

Helena, Georgia, July 4, 1903.

REVIEWS

Mosses with Hand-Lens and Microscope*

The above work, the first part of which has recently appeared, has been inspired by the demand for the author's "Mosses with a Hand-Lens" and is a continuation and extension of similar

* **Grout, A. J.** Mosses with Hand-Lens and Microscope. A non-technical Hand-Book of the more common Mosses of the Northeastern United States. Part I. 8vo. Pp. 1–86. *pl. 1–10* + *f. 1–35* + *f. 1–46*. Published by the author, 360 Lenox Road, Borough of Brooklyn, New York. Je. 1903. Price $1.00.

methods into the domain of the compound microscope. The earlier work dealt specifically with a hundred of our larger and more easily recognized mosses; the present, while not aiming at completeness, is to treat of more than two hundred of the more common species of the northeastern United States. The "Introduction" is followed by chapters on "Classification and Nomenclature," "The Collection and Preservation of Mosses," "How to Mount Mosses," "Methods of Manipulation," "Life-History and Structure of the Moss-Plant," "Illustrated Glossary of Bryological Terms," and "List of the more important Works on Mosses that will be of Help to American Students;" then comes the "Manual," which includes keys to the principal families and genera and to the species of the larger genera. The descriptions are brief and are concerned only with the more important and distinctive characters. Most of them are accompanied by illustrations of the species described. Many of the figures and plates are photographic reproductions of the beautiful plates of the Bryologia Europaea and of Sullivant's Icones Muscorum, which the author modestly and frankly says are "superior to any that I could have had made." Each of the borrowed plates is duly credited to its source, though, unfortunately, in a few cases, "(Bry. Eur.)" immediately follows the name of the plant on the plate, as is done by some authors when they wish to indicate that merely the name originated in the Bryologia Europaea. The author justifies his free use of these classical figures by the plea that they are in this way being made accessible to very many who would otherwise be unable to consult them. It is perhaps to be fairly questioned whether a student who has got beyond "Mosses with a Hand-Lens," the author's earlier and simpler work, is not prepared for a manual which shall attempt to include descriptions of *all* of the mosses of the region covered, yet the present work will doubtless meet a ready sale and will do much toward popularizing the study of these interesting plants. The style is attractive both as to literary and mechanical execution. It is expected that four or five parts will complete the work and that Part 2 will be ready for distribution in January, 1904.

M. A. H.

PROGRAM OF FIELD DAYS OF THE TORREY BOTANICAL CLUB, JUNE TO NOVEMBER, 1903.

June 6. — Valley Stream, Long Island. Leave by East Thirty-fourth Street Ferry at 1.00 P. M. Excursion fare 75 cents. Guide, Miss Powers.

June 13. — Great Notch, N. J. Leave by Chambers Street Ferry at 1.30 P. M. Excursion fare 75 cents. Guide, Mr. Kato.

June 20. — Moonachie, N. J. Leave by Christopher or Barclay Street Ferry at 1.00 P. M. Take trolley to Lieve's Corner, thence northward. Fare 26 cents. Guide, Mr. Nash.

June 27. — Milburn, N. J. Leave by Christopher Street Ferry at 12.30 P. M. Walk over Orange Mountain. Excursion fare 60 cents. Guide, Dr. Rusby.

July 4. — Toms River, N. J. Leave foot of Liberty Street (C. R. R. of N. J.) at 1.30 P. M., Friday, July 3. Excursion fare $3.00. Guide, Dr. MacDougal.

July 11. — Aqueduct, Long Island. Leave by East Thirty-fourth Street Ferry at 1.00 P. M. Excursion fare 50 cents. Guide, Miss Brainerd.

July 18. — N. Y. Botanical Garden. Leave by N. Y. & Harlem R. R. at 2.00 P. M. Excursion fare 25 cents. Guide will meet party at Garden.

July 25. — Monsey, N. Y. Leave by Chambers Street Ferry at 9.40 A. M. Excursion fare $1.30. Guide, Mrs. H. Brainerd, who will meet party at Monsey.

August 1. — Grantwood, N. J. Leave by West Forty-second Street Ferry at 1.30 P. M., then by trolley. Fare 30 cents. Guide, Mr. Kato.

August 8. — Cliffwood, N. J. Leave by Liberty Street Ferry (N. J. Central R. R.) at 11.30 A. M. for Keyport, then by rowboat across the bay. Returning leave Keyport at 5.40 P. M. Fossil plants. Excursion fare about $1.25. Guide, Mr. Edward W. Berry.

August 15. — Grassmere, Staten Island. Leave by Staten Island Ferry at 1.30 P. M., then by trolley. Fare 20 cents. Guide, Miss Lawall.

August 22. — Fort Lee and Englewood, N. J. Leave by West One Hundred and Twenty-ninth Street Ferry at 1.20 P. M., then by trolley. Fare 30 cents. Guide, Dr. Hommel.

August 29. — Arlington, Staten Island. Leave by Staten Island Ferry at 1.30 P. M., then by Rapid Transit R. R. Fare 30 cents. Guide, Mr. Damon.

September 5. — Labor Day. Arlington, N. J. Leave by West Twenty-third or Chambers Street Ferry at 1.30 P. M. Fare about 25 cents. Guide, Dr. Rusby.

September 12. — Bartow, N. Y. Leave by railroad at One Hundred and Twenty-ninth Street terminus of the Third Avenue Elevated R. R. at 1.40 P. M. Fare 25 cents. Return by trolley. Fare 10 cents. Guide, Mr. Ericson.

September 19. — Moonachie, Carlstadt, N. J. Leave by Christopher or Barclay Street Ferry at 1.00 P. M., then by trolley to Lieve's Corner. Fare 26 cents. Guide, Mr. Eugene Smith.

September 26. — New Orange, N. J. Leave by Whitehall or Liberty Street Ferry (C. R. R. of N. J.) at 12.55 P. M. Change train at Aldene for New Orange. Excursion fare 50 cents. Guide, Dr. Rydberg.

October 3. — Plainfield, N. J. Leave by Liberty Street Ferry at 11.00 A. M. Excursion fare $1.10. Guide, Miss Noll.

October 10. — Richmond, Staten Island. Leave by Staten Island Ferry at 1.00 P. M., then by trolley. Fare 20 cents. Guide, Miss Motts.

October 17. — Mosholu, N. Y. Leave One Hundred and Fifty-fifth Street and Eighth Avenue, terminus of Ninth Avenue Elevated R. R. at 1.30 P. M. Excursion fare 25 cents. Guide, Miss Murray.

October 24. — Forest Park, Long Island. Leave Brooklyn Bridge at 1.00 P. M. by Ridgewood Elevated R. R., then transfer to trolley. Fare 10 cents. Guide, Miss Austin.

October 31. — Wakefield, N. Y. Leave Grand Central Station at 1.00 P. M. Excursion fare 30 cents. Guide, Miss Jacobs.

November 3. — Election Day. Prince's Bay, Staten Island. Leave foot of Whitehall Street by ferry at 11 A. M. Return as desired. Guide, Dr. Hollick.

November 7. — Fort Lee, N. J. Leave by West One Hundred and Twenty-ninth Street Ferry at 1.15 P. M., then by trolley. Fare about 30 cents. Guide, Prof. Underwood.

November 14. — Rockaway, Long Island. Leave by East Thirty-fourth Street Ferry and L. I. R. R., at 1.00 P. M. Excursion fare about 60 cents. Guide, Mr. McCallum.

November 21. — Palisades Park, N. J. Leave by West One Hundred and Twenty-ninth Street Ferry at 1.00 P. M., then by trolley. Fare 30 cents. Guide, Mr. Dodds.

November 28. — Richmond, Staten Island. Leave by Staten Island Ferry at 1.00 P. M. Fare 20 cents. Guide, Miss Lawall.

NEWS ITEMS

Dr. D. T. MacDougal and family are in Jamaica during the present month.

Professor A. W. Evans sailed for Jamaica about the first of July to investigate the hepatic flora of the island.

The editor of TORREYA returned to New York on July 12, after a two months' visit to Porto Rico.

Mr. W. T. Horne, a graduate of the University of Nebraska, has been elected to the fellowship in botany in Columbia University.

Professor H. M. Richards, of Barnard College, Columbia University, sailed for Europe on July 17. He will spend his vacation in England and Ireland.

We learn from *Science* that Dr. Douglas H. Campbell, professor of botany in Stanford University, is spending his summer vacation in New Zealand and Australia.

Joseph E. Kirkwood, who was granted the degree of Ph.D. by Columbia University at the last commencement, has been promoted to the rank of associate professor of botany in Syracuse University.

Dr. and Mrs. W. A. Murrill sailed for Europe on July 4. Dr. Murrill will occupy his time chiefly in mycological studies in Italy and France, with a brief visit to Kew before his return.

Mr. Filibert Roth, formerly assistant professor of forestry in Cornell University, has been appointed professor of forestry in the University of Michigan.

Mr. Stewart H. Burnham, for the past two years an assistant at the New York Botanical Garden, has removed to Springfield, Mass., to accept a position on the literary staff of Webster's Dictionary.

Miss Winifred J. Robinson, instructor in botany in Vassar College, and Dr. B. E. Livingston, instructor in plant physiology in the University of Chicago, have been granted resident research scholarships at the New York Botanical Garden.

Mr. Roland M. Harper is in Georgia continuing his field-work upon the flora of that state. This year his explorations have been assisted by a grant from the Herrman Fund of the Scientific Alliance of New York.

Professor Francis Ernest Lloyd and Miss Mary Elizabeth Hart were married at New York City, May 18, 1903. Professor and Mrs. Lloyd are now in the West Indies, where they expect to spend most of the summer in botanical exploration upon the island of Dominica.

Henry Griswold Jesup, A.M., for twenty-two years professor of botany in Dartmouth College, died at Hanover, N. H., on June 15. He was the author of "A Catalogue of the Flowering Plants and Higher Cryptograms" found within about thirty miles of Hanover, N. H., published in 1891, and of a preliminary catalogue published in 1882.

The "Algae of Northwestern America" by Professor William Albert Setchell and Mr. Nathaniel Lyon Gardner, a paper comprising pages 165–418 and plates 17–27 of Vol. 1 of the University of California Publications (Botany), has recently been issued. The work consists of an annotated list with descriptions and figures of several new forms and species and of a new genus, *Whidbeyella*.

The "Flora of the Southeastern United States" by Dr. John K. Small, Curator of the Museums and Herbarium of the New York Botanical Garden, will be published, it is expected, at about

the date of the appearance of this issue of TORREYA. The work makes a volume of 1,382 pages, of large octavo size, and includes descriptions of 6,364 species. The published price is $3.60. It is expected that a further review of this important work will appear in the next number of this journal.

Part 2 of Volume 8 of the Contributions from the National Herbarium consists of a paper on the "Economic Plants of Porto Rico" by O. F. Cook and G. N. Collins. The plants are arranged alphabetically under Latin, Spanish, and English names in a single series. The more important are discussed at length and many are illustrated from photographs. The work will prove of much value to those interested in the common and useful plants, not only of Porto Rico, but of tropical America in general.

The list of botanical visitors in New York City since March 19 includes Mr. Lyster H. Dewey, U. S. Department of Agriculture, Washington; Mr. C. G. Lloyd, Cincinnati, Ohio; Mr. W. W. Eggleston, Rutland, Vt.; Dr. George T. Moore and Dr. H. J. Webber, Bureau of Plant Industry, Washington; Dr. J. N. Rose, U. S. National Museum, Washington; Miss Mary A. Day, Gray Herbarium, Cambridge, Mass.; Professor W. G. Farlow, Harvard University; Dr. Theodor Holm, Brookland, D. C.; Mr. Charles Louis Pollard, U. S. National Museum, Washington; Mr. John A. Shafer, Carnegie Museum, Pittsburgh, Pa.; Dr. J. E. Kirkwood, Syracuse University; Mr. George H. Shull, Chicago; Professor A. W. Evans, Yale University; Professor D. S. Johnson, Johns Hopkins University; Mr. William R. Maxon, U. S. National Museum, Washington; Professor J. B. S. Norton, College Park, Md.; Professor Francis Ramaley, Boulder, Colo.; Dr. E. Mead Wilcox, Auburn, Ala.; Mr. R. M. Laing, Christ Church, New Zealand; and Dr. E. J. Durand, Cornell University.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–29 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–29 (1882–1902) are furnished at the published price of two dollars each; Vols. 28 and 29, three dollars each.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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A Monthly Journal of Botanical Notes and News

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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TORREYA

August, 1903

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AN APPARATUS FOR DETERMINING GAS INTERCHANGE IN A SMALL SPACE

By H. M. Richards

In investigating the question of the CO_2–O_2 coefficient in dealing with small objects, one is confronted with several difficulties. There have been devised a number of different forms of apparatus which are indeed applicable to this purpose, but they require large masses of the material under investigation. It is often exceedingly tedious, especially for an experiment which must be repeated several times, and at times indeed impossible, to get together enough material. With the idea in view of obviating this trouble, the writer constructed the herein described piece of apparatus for some work being carried on in his laboratory, which unfortunately could not be completed by the investigator who was undertaking it.

The essential feature of the apparatus is a glass bulb, say an inch to an inch and a half long, by about three fourths of an inch in diameter, one end of which is drawn to a tube of one fourth inch internal bore, and the other end joined to a longer piece of capillary tubing bent in a double L. This will be readily understood by reference to the figure (Fig. 1). This tube in fact constitutes the respiration chamber and of course can be made of any desired size; in the case in question it was desirable to keep it as small as possible. The material is introduced through the larger aperture and then a sufficiently tight and thick-walled rubber tube is brought over the end, by which another capillary tube, also bent in an L, is affixed. This tube leads down under a mercury-bath, and a pinchcock is

[Vol. 3, No. 7, of Torreya, comprising pages 97–112, was issued July 25, 1903.]

placed at the point where the capillary tube joins the bulb. The first act is to join this capillary with a tube leading from a tank of mercury placed high enough above the apparatus to ensure a prompt flow into the chamber when the glass cock on the reservoir is opened. The other capillary, which is permanently a part of the bulb, is also brought down under mercury, and there joined to a very short L, ending in a point directed upwards ; this is completely immersed in mercury. After the objects in the bulb have been allowed to respire for some definite recorded period, samples of the gas within may be easily taken by simply opening the pinchcock and very cautiously turning the stopcock connected directly with the mercury reservoir. This will, of course, force

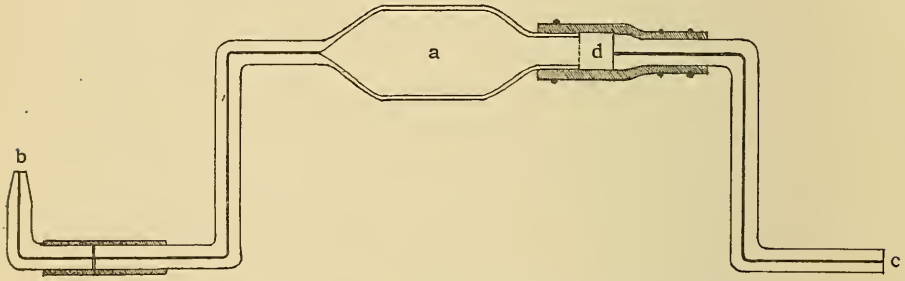


FIG. 1. *a*, respiration chamber; *b*, delivery tube; *c*, tube attached to mercury reservoir. Both *b* and *c* are immersed in mercury. *d*, place where screw compressor is attached. The rubber tubing is shaded, all the rest is of glass.

out bubbles of gas from the other end of the apparatus, which may be readily collected in the tube held over the nozzle. This being done, the tube is transferred to the gas analysis apparatus, preferably one of the Bonnier-Mangin type and the CO_2 determined. All of this is very simple, but of course there are certain precautions which must be taken and certain procedures gone through with if the results are to be quantitative. To begin with, it is necessary to determine the volume of gas within the apparatus, unless only a purely comparative result is required. This process presents, it is true, a little manipulative difficulty, but nothing that is insurmountable. It is most easily done by weighing the apparatus, fitted up in exactly the manner in which it is to be used, first empty and then full of water. In

immersing the delivery end of the apparatus in the mercury, the latter of course runs back a little way into the capillary tube, but this constitutes only a very slight compression and not, in such a case as this, a recognizable change of volume if the other end of the apparatus has been closed at the time of this operation. It will also be necessary to determine the displacement of the material put within the tube, and where a considerable number of similar determinations are to be made this is most easily and sufficiently done by determining once for all the specific volume of the objects to be experimented with. After this has been done, simply weighing the tube before and after introducing the material will give the necessary correction to be applied to the gross volume of the apparatus. That this method gives a very fairly accurate result is shown by the following analyses. Several samples of the gas within the tube were taken in the manner described and then the remaining gas was collected bodily by disconnecting the tube and forcing all of the gas out into a receiver. The analyses were made on the Bonnier-Mangin apparatus.

CONTROL EXPERIMENT FOR DETERMINING ACCURACY OF APPARATUS

A number of germinating grains of wheat in apparatus for two hours.

Sample No. 1 (taken as described)	per cent. CO_2		3.57
" No. 2 " " "	" " "		3.61
" No. 3 " " "	" " "		3 65
Remainder of gas in tube, analysis No. 1	" " "		3.59
" " " " " " " 2	" " "		3.55

While this shows a little variation it is no more than is to be expected, and not enough to invalidate the method for the purposes required. It is not supposed that this method is accurately quantitative in the sense of the chemist who is investigating atomic weights. It is the mistake of the novice to employ methods which exceed in accuracy the necessities of the case; in dealing with living organisms the individual range of variation may be, and usually is, so great that it is absurd in the majority of instances to carry results out further than five in the second decimal place.

Another object in constructing this apparatus was to be able to subject the plant parts under investigation to atmospheres

of other mixtures of gases than air and this is very easily accomplished by simply connecting the receiving end of the apparatus in the beginning, not at once with the mercury reservoir, but with a gas tank or generator of the gas desired. After a current has been run through the apparatus long enough to ensure the complete replacement of air, the apparatus may then be connected with the mercury supply as before.

There are many operations to which this apparatus is applicable.

Barnard College, Columbia University.

HEXALECTRIS APHYLLUS, A TRUE SAPROPHYTE

By Winifred J. Robinson

The New York Botanical Garden recently received from Mr. R. M. Harper, living specimens of *Hexalectris aphyllus*, collected at Cuthbert, Ga., July 17, 1903, which have unusual interest, from their unique saprophytic character.

The term saprophyte has been applied to plants in all stages of dependence upon organic substances for food, since the time when Aristotle formulated his comprehensive class of humus plants. Pfeffer * says: "Plants which are unable to assimilate carbon dioxide must obtain all their organic food materials from without (heterotrophic or allotrophic nutrition); by others a portion only of their organic food is obtained from the external world, the rest being supplied by the imperfectly developed chlorophyl apparatus (mixotrophic plants)." Green (Intr. to Veg. Phys., 198) states that "the characteristic feature of saprophytes is that they derive at least a part of their food from decaying animal or vegetable matter, absorbing it in some cases as actual food-stuffs, and in others as organic compounds which require relatively little expenditure of energy to build them up into proteids or carbohydrates." MacDougal † takes into account the nutritive unions formed with mycorhizas and bacterial

* Phys. of Plants, translated by Ewart, 1: 363. 1899.

† Symbiosis and Saprophytism. Bull. Torrey Club, 26: 511. 1899.

organisms and restricts the meaning of saprophyte to "those species which derive their supply of food from organic products directly, without the intervention of the activity of chlorophyl and unaided by other organisms." In the last conception of the term, *Wullschlaegelia aphylla*, a near relative of *Neottia*, the so-called bird's-nest orchid, described by Johow, * is the only seed-plant known to be a true saprophyte, with the exception of *Hexalectris aphyllus*.

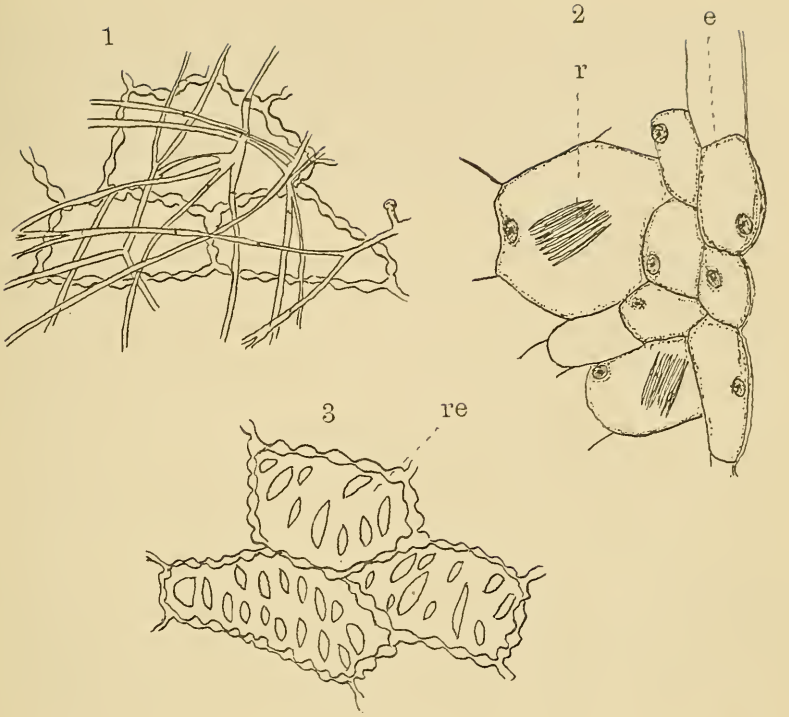
Hexalectris aphyllus is a monotypic orchid of the southern United States and Mexico, where it grows in relatively dry, sandy soil, mixed with humus. It usually occurs singly, and though the rhizomes are perennial, the appearance of the blossom one season by no means assures its being found in the same locality the following year. The plant consists of a fleshy, succulent, scaly rhizome (Figs. 4 and 5) from 7 cm. to 15 cm. long and from 5 mm. to 15 mm. in diameter, which sends out branches from its ring-like nodes and terminates in a scape from 20 cm. to 40 cm. in height. The scape bears purplish scales, the lower truncate and sheathing, the upper acuminate, and terminates in a raceme of from eight to twelve brownish-purple flowers. The rhizome has no roots, though it is wrongly figured in Britton and Brown's "Illustrated Flora" (Fig. 1146) as possessing coralloid roots. It has no trichomes, and no stomata could be found in the epidermis of the rhizome though they are present in small number in the epidermis of the scape and its scale leaves. The epidermis of the rhizome consists of prism-shaped cells flattened radially, their long axes extending in a direction at right angles to that of the axis of the stem. The outer walls have reticulate thickenings (Fig. 3), which correspond in appearance to the epidermal cells of the roots of some epiphytic orchids. They contain protoplasm and have large nuclei (Fig. 2, *e*). Within the epidermis are one or two rows of short columnar cells and within these the large thin-walled turgid cells which form the bulk of the rhizome. The large nucleus in each cell lies in the protoplasm near the wall and the remaining cell contents are fluid with the exception of small bluish granules, probably proteid, in

* Jahrb. wiss. Bot. 16: 445. 1885.

some cells and the large clusters of needle-like raphides in others which are scattered through the parenchyma, being more numerous near the epidermis than elsewhere (Fig. 2, *r*). No trace of starch could be found. The fibro-vascular bundles consist of a few spirally thickened tracheids and some small proteid-carrying elements.

The epidermal cells of *Hexalectris* are evidently accommodated directly to the absorption of water and food-stuffs, for as Green suggests as to the hairless roots of *Neottia*, "lying in a bed of humus, they do not need such close contact with continually fresh particles of soil as do the roots of the ordinary phanerogam, hence short-lived hairs are unnecessary." * The epidermal cells with their reticulate thickenings may serve, like the velamen cells of the roots of epiphytic orchids, both as a sponge to absorb moisture and also as a protective organ to prevent its escape. The presence of raphides, which are insoluble in water, so near the epidermis may have something to do with the breaking down of the humus compounds which are very slightly soluble in water. The addition of a small quantity of acid causes the raphides to dissolve and thus an acid may make them available to attack the humus. Such crystals are mentioned in the stems or roots of other plants which absorb organic matter, as in *Phoradendron villosum* by Cannon,† in *Grammatophyllum speciosum* by Groom,‡ and in *Cephalanthera Oregana*, by MacDougal.§ Pfeffer || has shown by experiment that some especial apparatus is necessary for making humus available to seed-plants. A few septate filaments of a fungus are found upon the rhizome, scape and seed-capsule of *Hexalectris*, but it cannot be seen to enter the cells at any point nor to come into close contact with them, besides it is not sufficient in quantity to perform the practical work of a symbiont, though its presence may serve to retain moisture near to the epidermal cells. Its presence on the seed-capsule suggests a possible example of Bernard's theory that a

* Intr. to Veg. Phys. 199. 1899.
† Bull. Torrey Club, 28 : 377. 1901.
‡ Ann. Bot. 7 : 146. 1893.
§ Bull. Torrey Club, 26 : 514. 1899.
|| Pfeffer, Phys. of Plants, trans. by Ewart, 1 : 367. 1899.



HEXALECTRIS APHYLLUS.

fungus mycelium is necessary to tuber-formation in orchids, though he states that infection occurs first in the root of the orchid. * In view of the above facts, *Hexalectris aphyllus* may be regarded as a true saprophyte, deriving its nourishment from the disintegrating organic matter of the soil, by the direct absorption of its epidermal cells, with no roots, hairs, or other organs differentiated for absorption.

The herbarium of the New York Botanical Garden contains specimens of *Hexalectris aphyllus* collected as follows: Alabama, Auburn, Lee Co., *L. M. Underwood*, 1896; *S. M. Tracy*, 1897. Arkansas, Little Rock, *Dr. H. E. Hasse*, 1885. Florida, Jacksonville, *H. D. Keeler*, 1870–76; Lake Co., *Geo. V. Nash*, 1895. Georgia, Alcovy Mt., Oconee Co., *J. K. Small*, 1893; Kenesaw Mt., *R. M. Harper*, 1900; Mt. Rachel, Dalton, *Percy Wilson*, 1900. Kentucky, Lexington, *Dr. C. W. Short*, 1835. Missouri, Kennett, *B. F. Bush*, 1895; St. Louis, *H. Eggert*, 1891. North Carolina, Swain Co., *H. C. Beardslee & C. A. Kofoid*, 1891. South Carolina, Paris Mt., *J. K. Small*, 1896. Tennessee, Nashville, *Dr. A. Gattinger*, 1898; Wolf Creek Station, *Thos. H. Kearney*, 1897. Mexico, San Luis Potosi, *Dr. J. G. Schaffner*, 1879.

Explanation of Figures

Hexalectris aphyllus. 1, cells from epidermis with overlying fungus hyphae; 2, epidermal cells (*e*) and raphide-containing cells (*r*); 3, cells from epidermis showing reticulations (*re*); 4, rhizome; 5, rhizome with branches and scape (*s*).

Laboratory of the New York Botanical Garden.

SOME PLANTS OF SOUTHEASTERN VIRGINIA AND CENTRAL NORTH CAROLINA

By Roland M. Harper

On my way to Georgia in June of this year I made in passing through Virginia and North Carolina the following observations, which will add something to our knowledge of the distribution of several interesting plants.

* Bernard, Rév. Gen. Bot. 14: 17. 1902.

My itinerary through these two states was as follows: On the 10th I spent most of the day in the vicinity of Norfolk and Portsmouth, in a region which has often been visited by well-known botanists, and has had its phytogeographical features described in several published papers, particularly in Mr. Kearney's admirable "Report on a Botanical Survey of the Dismal Swamp Region."*

On the 11th I went from Portsmouth westward sixty miles through the coastal plain of Virginia and southwestward across North Carolina, by the Seaboard Air Line, entering the latter state near Margarettsville. About twenty miles farther west, near Weldon, on the Roanoke River, the railroad crosses the fall-line and enters the Piedmont region. Thence continuing southwestward by way of Raleigh, the coastal plain is entered again near Sanford, in Moore County.

From there to Hamlet, in Richmond County, near the South Carolina line, where darkness overtook me, I passed through an extensive sand-hill region which is doubtless a continuation of the fall-line sand-hills of Georgia and South Carolina. These North Carolina sand-hills were particularly interesting to me because I had never seen them mentioned in botanical or geological literature, and they probably have not been explored as much as they deserve, though they are on one of the principal routes of travel between the North and South, and are visited by many tourists during the winter season.

The inland edge of the Columbia formation (of which these and other sand-hills in the southeastern United States are composed) is represented on the best map of this formation I have seen as being about forty miles nearer the coast, a remarkable discrepancy.

For the last fifteen miles north of Hamlet scarcely any signs of civilization were seen. This is a characteristic feature of many sand-hill regions, where the sand is so deep that the land is of little value for agricultural purposes.

Among the plants observed on this trip the following deserve special mention.

* Contr. U. S. Nat. Herb. 5 : 321–550. *pl. 65–77. f. 51–90.* 1901.

Pinus palustris Mill.

Seems very rare in Virginia, but commoner in the coastal plain of North Carolina, especially on the sand-hills. Where none of this pine is in sight from the railroad its occurrence in the vicinity may often be inferred from the presence of wood-burning locomotives on the numerous branch roads, even several miles west of the fall-line. The two winter resorts in Moore County, Pinehurst and Southern Pines, of course take their names from this species. Some turpentine has been extracted from it near Pinebluff, in the same county.

Pinus serotina Michx.

On the morning of the 10th I found several small trees of this species, fruiting abundantly, in low grounds in Norfolk County, Virginia, about three miles southwest of Portsmouth. The characteristic long persistence of the cones was well shown by the fact that some of them remained attached to limbs which had grown to a diameter of an inch and a half. To make sure that there was no mistake about the species (which was not previously known to occur north of North Carolina, and is not mentioned in floras of the Northern States, or even in Mr. Kearney's Dismal Swamp report), fresh specimens were immedately sent back to Washington for verification.

Other plants occurring at the same place were *Pteridium aquilinum*, *Scleria triglomerata*, *Aletris farinosa*, *Liquidambar Styraciflua*, *Polygala lutea*, *Rhus copallina*, *Acer rubrum*, *Gaylussacia frondosa* and *Eupatorium ovatum*.

The next day I saw a good deal of this pine from the train between Portsmouth and Suffolk, where it often forms colonies almost unmixed with other trees. Beyond Suffolk I did not see it again until I reached the sand-hills of North Carolina, where there is a good deal of it in the vicinity of Keyser and elsewhere.

Chamaecyparis thyoides (L.) B.S.P.

Abundant for a few miles in Moore County, N. C., between Aberdeen and Keyser, in non-alluvial swamps among the sand-hills. I have not met with this species anywhere else south of New England.

Taxodium distichum (L.) Richard

Seen in several river-swamps in and adjacent to Southampton County, Va., especially along the Blackwater, Chowan and Mehenin rivers. Almost always associated, here as in Georgia, with *Nyssa uniflora*, which has nearly the same range.

Taxodium imbricarium (Nutt.) Harper

My hopes of seeing this species in Virginia were not realized, but I noticed some fine specimens of it in a swamp at the southern edge of Moore County, N. C., near Keyser, about 125 miles from the coast.

Scirpus atrovirens Muhl.

In ditches and meadows near Cary, Wake County, N. C., in the Piedmont region.

Hicoria aquatica (Michx. f.) Britton

Along the Mehenin River on the line between Southampton County, Va., and Northampton County, N. C. Stations for this species so far north are probably rare enough to be worth mentioning.

Quercus Catesbaei Michx.

Common on the driest sand-hills of North Carolina, from Walnut Grove southward. In Richmond County this with *Pinus palustris* forms almost the only arborescent vegetation for miles. Probably not reported so far inland in North Carolina before.

Quercus minor Margaretta Ashe

With the preceding but less common. Noted especially between Vass and Niagara, Moore County, N. C. Very little has been published concerning the exact distribution of this oak, so the above record may be of some service.

Sarracenia flava L.

This species is so conspicuous and easily distinguished that I rarely fail to make a note of it wherever I see it. There is a little of it between Margarettsville and Seaboard in the coastal plain of North Carolina, a few miles south of the Virginia line, also near

Littleton, west of the fall-line. In the sand-hill region it is very common, being rarely out of sight for about 30 miles, from Sanford to Keyser. (In Georgia I have not seen it within 50 miles of the fall-line.)

ACANTHOSPERMUM AUSTRALE (L.) Kuntze

First seen on this trip at Manly, Moore County, N. C., which is about five miles farther north than Aberdeen, where I observed it three years before.* This weed is doubtless steadily pushing northward. It is now very abundant around Aberdeen.

PARTHENIUM INTEGRIFOLIUM L.

Seen at several points west of the fall-line in Warren and Wake counties, N. C., in dry soil.

LESLIE, GEORGIA, July 10, 1903.

A KEY TO THE NORTH AMERICAN SPECIES OF PLUTEOLUS

BY F. S. EARLE

The genus *Pluteolus* includes those gill-fungi having a smooth, viscid, usually expanded pileus, free gills, yellowish-brown spores, and slender usually hollow stems. Some of the species have been confused with *Galera*, from which they may be distinguished by the expanded viscid pileus and free gills. Others have been referred to *Bolbitius* from which they differ in the persistent gills that do not deliquesce with age. The following ten species and varieties have been reported from North America. They usually grow either on manured ground or on old rotten wood.

1. Pileus pure white when young, sordid with age.	*P. sordidus* (Lloyd) Peck
Pileus pinkish-gray, often cespitose.	*P. coprophilus* Peck
Pileus yellow.	*P. luteus* Peck
Pileus brown or olivaceous.	2.
Pileus violaceous, rugose-reticulate.	*P. reticulatus* (Pers.) Gillet
2. Stipe fibrillose.	3.
Stipe glabrous or pruinose.	4.

*See Bull. Torrey Club, 28 : 454. 1901.

3. Stipe pallid; pileus 3–4 cm.; odor none. *P. Leaianus* (Berk.) Sacc.
Stipe brown-fibrillose; pileus 5–8 cm.; odor of decayed cheese.
P. mucidolens (Berk. *).

4. Pileus with no greenish or olivaceous tints. 5.
Pileus olivaceous or greenish-brown. 6.

5. Pileus grayish-brown; stipe pure white. *P. aleuriatus gracilis* Peck
Pileus yellow-brown or pink-brown; stipe yellow. *P. expansus* (Peck) Peck

6. Pileus 3–4 cm., uniformly pale olivaceous-brown. *P. expansus terrestris* Peck
Pileus 1–2 cm., olivaceous, umbo chestnut, becoming metallic green in dried specimens. *P. callistus* (Peck) Peck

New York Botanical Garden.

REVIEWS

Flora of the Southeastern United States †

In the presentation of this mammoth contribution to the literature of southern botany, Dr. Small has rendered science an invaluable service and the student of the flora a much needed and most welcome publication. For more than four decades the field has been covered and studied mainly through the medium of Dr. Chapman's most admirable Flora of the Southern United States, but in recent years, to keep pace with the great activity in taxonomic botany, the many changes which have been suggested in generic limitations and particularly the changes incident to the adoption of the newer classification, sytematic arrangement and nomenclature, it has been necessary to consult the files of numerous periodicals and books, the extent of which is seldom found outside of the largest libraries. It is to those who have labored under such difficulties that this volume of nearly fourteen hundred pages will most strongly appeal. The extension of the range in the present work, which includes also the region lying between the Mississippi River and the one hundredth meridian south of the northern boundaries of Arkansas, Indian Territory and Oklahoma, will add commensurately to its value.

* *Agaricus* (*Galera*) *mucidolens* Berk. Lond. Jour. 4: 301. 1845.

† **Small, J. K.** Flora of the Southeastern UnitedStates. Large 8vo. Pp. i–xii, + 1370. 22 Jl. 1903. Published by the author, Bedford Park, New York City. Price $3.60.

In a brief preface the author states the object of the Flora—the presentation of "descriptions of the seed-plants, ferns and fern-allies growing naturally within the southeastern United States as limited by the northern boundaries of North Carolina, Tennessee, Arkansas, Indian Territory and Oklahoma, and the one hundredth meridian, together with the known geographical distribution of each species." Following the preface is a table of contents, and on the remaining pages designated by Roman numerals appears an admirable key to the orders.

The sequence of the plant-groups follows mainly, but not always, the arrangement adopted by Engler and Prantl in their Natürlichen Pflanzenfamilien, the most noteworthy exceptions being found in the positions assigned to the orders Santalales and Aristolochiales, which are placed many steps higher up in the systematic arrangement.

The nomenclature is in accordance with the Rochester and Madison code, the principles of which are now so well established, and besides, English or vernacular names have been associated with the more widely known species. The chief characters of the subkingdoms with their classes and subsequent families and genera appear in their positions throughout the text, and lucid analytical keys have been prefixed to their descriptions and to those of the species.

Turning over the neatly printed pages, the reviewer is impressed by the excellence of the typography and the ease with which the eye can differentiate and find the subject matter. The specific descriptions are terse and diagnostic, and the use of the metric system adds greatly to the precision. Frequent acknowledgments of contributions, revisions or assistance from specialists appear among the pages, showing that about twenty-five persons have so aided in the work, while the number of contributed manuscripts is as many as twenty-eight. The present tendency to separate natural groups of plants into distinct genera is strongly illustrated in the present work, some striking examples being found in the treatment of the families Oxalidaceae, Euphorbiaceae, Spondiaceae and the tribe Galegeae of Fabaceae. This practice has the peculiar advantage of diminishing the size of

often cumbersome groups, thereby facilitating their study and arrangement. At intervals throughout the work forty-seven new genera are described, while the original descriptions of new species aggregate more than three hundred. Pages 1321–1325 are devoted to an appendix, and contain a number of descriptions of plants discovered within the range during the several years the book was in press, together with a few corrections. The remaining pages are devoted to a list of the genera and species published in the volume, a tabulated list of the orders and families and a copious index.

By the advent of this book, which so completely sets forth the most recent botanical knowledge of an area of almost 650,000 square miles, the cause of southern botany has received an impulse that has long been needed.

C. D. Beadle.

NEWS ITEMS

Dr. D. T. MacDougal returned on July 29 from a month's visit to the island of Jamaica.

W. H. Pearson, Esq., of Park Crescent, Victoria Park, Manchester, England, desires to find a purchaser for set No. 4 of Spruce's "Hepaticae Amazonicae et Andinae."

Dr. J. N. Rose, assistant curator, Division of Plants, of the U. S. National Museum, is having a botanical outing in Mexico. He was expecting to reach the City of Mexico about August 20.

Miss Anna Murray Vail, librarian of the New York Botanical Garden, returned on August 4 after a three months' absence in Europe, bringing with her five or six hundred volumes for the library of the Garden.

Mr. J. A. Shafer, custodian of the herbarium of the Carnegie Museum, Pittsburg, spent the last two or three weeks of July at the New York Botanical Garden, engaged in studying the collections recently made by him in Cuba.

Mr. George V. Nash, head gardener of the New York Botanical Garden, sailed for Haiti on July 25 with the intent of spending several weeks in making botanical collections there. He is

accompanied by Mr. Harry Baker of the Garden. Mr. A. E. Casse, manager of a plantation near Cape Haitien, is to coöperate with the party.

The "Flora of Pennsylvania" by Thomas Conrad Porter, D.D., LL.D., late professor of botany in Lafayette College, was issued on August 15. John Kunkel Small, Ph.D., curator of the museums and herbarium of the New York Botanical Garden, has edited the work and supplied keys to the orders, families, genera and species. The general distribution of each species is given and the distribution by counties in Pennsylvania. The work forms an octavo volume of 362 pages. Ginn & Co., of New York and Boston, are the publishers.

We regret to note in recent newspapers announcements of the death of the following American botanists: Mr. Isaac Holden, of Bridgeport, Conn., well known as a student of the algae; Hamilton G. Timberlake, assistant professor of botany in the University of Wisconsin; Dr. A. Gattinger, of Nashville, Tenn., author of "The Flora of Tennessee and a Philosophy of Botany"; Hamilton L. Smith, LL.D., formerly professor of physics and astronomy in Hobart College, Geneva, N. Y., author of important papers on the diatoms; Mr. Charles J. Sprague, for many years curator of the herbarium of the Boston Society of Natural History and a student of lichens and fungi; and Miss Sadie F. Price, of Bowling Green, Kentucky, author of "The Fern-Collector's Handbook and Herbarium," "Flora of Warren County, Kentucky," etc.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–29 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–29 (1882–1902) are furnished at the published price of two dollars each; Vols. 28 and 29, three dollars each.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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Vol. 3 No. 9

TORREYA

September, 1903

LIRIODENDRON NOTES

By Edward W. Berry

Fossil Stipules. — In the Botanical Gazette, 34 : 57. 1902, I made the statement that fossil stipules of *Liriodendron* had not been found unless certain remains referred by Newberry, Lesquereux, and Hollick to *Paliurus* were to be so interpreted. I am now convinced that these remains are not those of stipules, although Hollick's *pl. 2. f. 12, 18, 19.* 1892, * are very similar superficially. I find I overlooked certain specimens figured and described by Heer as stipules in connection with *Liriodendron Meekii* from Greenland. † His figures are here reproduced (fig. 4) with the comment that they almost certainly represent mid-Cretaceous (Atane) *Liriodendron* stipules.

Seed Dispersal. — *Liriodendron* seeds are not eaten by mammals or birds, nor have they any means of attaching themselves to the hair of mammals or feathers of birds ; they are too large to be carried in mud-balls or mud-cakes, and their wings at best enable them to navigate just beyond the parent tree, so that the spread of the species has necessarily been comparatively slow. Their only means of crossing intervening water would be by floating in currents either attached to detached branches or more probably as individuals. The trees do not inhabit seashores but are common enough along river banks so that a river journey would have to precede an ocean voyage. The carpels remain on the trees until thoroughly dry, usually through the greater part of the winter, falling a few at a time as the winds dislodge them.

* Trans. N. Y. Acad. Sci. 12.

† Heer, Fl. Foss. Arct. 6^2 : 90. *pl. 23. f. 8.* 1882.

[Vol. 3, No. 8, of Torreya, comprising pages 113–128, was issued August 22, 1903.]

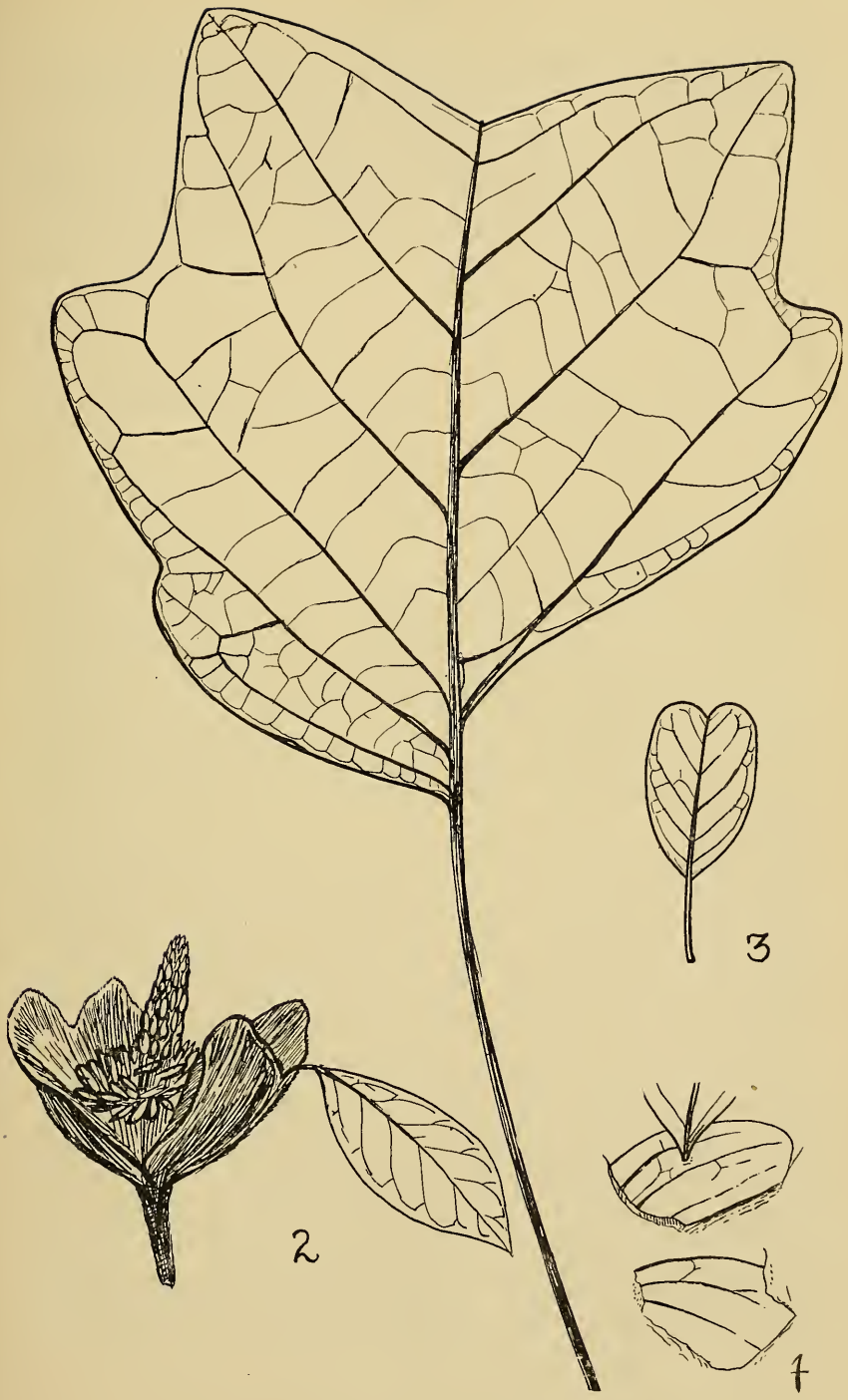
They float for a long period. Of five carpels put to soak on March 24, 1902, one sank on June 6, and the others were still floating on February 27, 1903, when the experiment was discontinued, a total period of 340 days. In an ocean current traveling but one half mile an hour they would be carried over 4,000 miles in 340 days. At the rate of flow of the Gulf Stream off Newfoundland (about one and two fifths miles per hour) they would be carried 10,744 miles, so that even if there was no land bridge to Europe by way of Greenland and Iceland the spread of the ancient species would not seem remarkably difficult.

A REVERTED LEAF-FORM. — Fig. 1 represents a leaf of *Liriodendron Tulipifera* L. from a grown tree at Passaic, N. J., showing the basal lobing which represents the first stage in the formation of stipules. It is very similar to the leaf figured in the Bull. Torrey Club, 28: *pl. 41. f. 1.* 1901, in both form and venation, representing however a stage not quite so far advanced as the latter.

ANOMALOUS LEAF OF MAGNOLIA (*fig. 3*).—The close relation of the genera *Magnolia* and *Liriodendron* is further emphasized by the retuse leaf of *Magnolia Virginiana* L. here figured. The similarity of the modern bud-leaves and stipules has been pointed out by Meehan and the writer. * The contemporaneous appearance of *Magnolia* and *Liriodendron* in the Raritan formation of New Jersey, their parallel development in geological time, and their similar geographical distribution at the present day, as well as their dispersal in ancient times all point to a common ancestor. This leaf, occurring next to the blossom (localized stage of Professor Jackson) also serves to corroborate the theory of the development of the *Liriodendron* leaf from a lanceolate-leaved ancestor.

With the exception of being smaller, our leaf is the counterpart of the *Liriodendron* leaf figured in Bull. Torrey Club, 28: *pl. 41. f. 6.* The *Liriodendron* leaves figured in Torreya, 2: *pl. 1. f. 1, 3.* 1902, are about the same size and are exactly similar in outline except for being slightly more retuse. Among fossil leaves it greatly resembles various arctic leaves referred by Heer to *Colutea* and to *Liriodendron Meekii*, and except for being only half as large it is a counterpart of the leaf of *Liriodendron*

* Compare *fig. 2* of *Michelia fuscata* (Andr.) Hance with Bull. Torrey Club, 28: *pl. 42. f. 10, 11.* 1901; and Torreya, 1: *pl. 1, 2.* 1901.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primaevum which Newberry originally described as *Leguminosites Marcouanus.*

EXPLANATION OF FIGURES

Fig. 1, basilar-lobed leaf of *Liriodendron Tulipifera* L.; Fig. 2, flower and leaf of *Michelia fuscata* (Andr.) Hance (from Prantl, after Baillon); Fig. 3, anomalous leaf of *Magnolia Virginiana* L.; Fig. 4, fossil *Liriodendron* stipules (after Heer).

PASSAIC, N. J.,
August 5, 1903.

THE DISTRIBUTION OF FUCUS SERRATUS IN AMERICA

BY C. B. ROBINSON

The serrated rockweed, *Fucus serratus* L,, has long been known to occur in abundance at Pictou, Nova Scotia, where it was first collected by Professor Fowler. Outside of this general locality it has never been found growing in America (if we except a very doubtful report from Newburyport, Mass.), and until lately its distribution was thought to be local, only two additional stations being recorded, Pirate Harbor, on the Strait of Canso, by Professor Macoun, and Pictou Island by Dr. A. H. Mackay.

Specimens brought from Broad Cove, Inverness, last summer, by Miss E. J. Fraser, extended the range some sixty miles to the northeast of the Strait, along the western side of Cape Breton, while others gathered at Pugwash early this spring by R. M. Benvie, removed the other boundary a like distance to the west of Pictou along the southern shores of Northumberland Strait.

These finds caused a systematic search to be undertaken along the entire coast of the Maritime Provinces, almost every important point upon the Gulf being explored, and in several cases the shores followed on foot for considerable distances. Much additional information has been obtained, which may be summarized as follows:

Although this rockweed is very common in all parts of Pugwash Harbor, no one has yet been able to find it farther west,

hence this appears to be its limit in that direction, and there is no reason to believe that it grows anywhere in New Brunswick.

East of Pugwash it is abundant at all points where any attempt has been made to find it, as far as Eastern Harbor on the west side of Cape Breton, a distance of over two hundred and fifty miles, following the coast. Its favorite habitat is a little below low-water mark, and being chiefly loosened by the heavier storms, it is driven by them high up on the beach, and in such profusion that especially in early spring it forms a nearly perfect belt often extending for miles. Throughout a tramp taken by the writer last March over twenty-five miles of coast around Cape John, it was never missed for more than a few yards, except at some exposed points, and similar expeditions elsewhere later in the season have had like results. It seems to be everywhere on the shores of Pictou County, except the heads of the harbors, and continues in equal abundance to the Strait of Canso, having been collected at Arisaig, Malignant Cove, Cape George and Linwood, all in Antigonish County, by Misses Chisholm, McKinnon, MacEachren and McLean, and subsequently by the writer at several intervening coves. It grows freely at Mulgrave also, but has not been traced beyond Professor Macoun's station at Pirate Harbor. It could not be found at Canso. On the eastern side of the Strait, only drift specimens were seen at Point Tupper and Port Hawkesbury, but only a short distance north of the latter it resumes its former abundance and maintains this at least as far as Broad Cove, and is reported at Eastern Harbor, thirty miles beyond, as still the commonest of all sea weeds. The observer, Thomas Gallant, adds the interesting fact that it has only become thus plentiful in recent years, that it formerly was quite rare.

There is indeed every likelihood that it is gradually extending its range, though the above is as yet the only actual observation on this point. Moreover, in many of those parts of Prince Edward Island where it is not found, the conditions appear to be highly favorable to its growth, and if so it may be expected to appear there at some future date. It may even be possible that it has been introduced from Europe in ballast, perhaps a century

ago, and has been gradually extending its range ever since, until it is now easily first among the marine plants of the district.

The only part of Prince Edward Island where it has yet been found is the extreme southeast, in the neighborhood of Murray Harbor and Cape Bear. It was first collected there in April, by J. Harper Prowse, but although as abundant as elsewhere, it remains so for only a few miles, and then gradually disappears. A solitary drifted specimen, half buried in sand, was found at the Wood Islands, fifteen miles to the west, but it seems not to grow there, and may possibly have drifted from the opposite shores of Nova Scotia. The farmers near Cape Bear gather the seaweeds driven ashore into so-called kelp beds for use as fertilizer. *Laminaria* is however only an occasional constituent, this rockweed forming at least three fourths of the whole.

On the twelve miles of coast bounding Pictou Island it is nowhere wanting.

While it has been alleged to grow at two or three points on the Atlantic coast of Nova Scotia, every report definite enough to be investigated has been shown to be without foundation, and at present there is every reason to believe that it is confined to the warmer waters of the Gulf. There its profusion is remarkable in view of its total absence elsewhere. Its only rivals are two other rockweeds, *Fucus vesiculosus* and *Ascophyllum nodosum*, and it is not only a more showy plant than either of these, but in the number of individuals exceeds them together.

New York Botanical Garden.

A KEY TO THE NORTH AMERICAN SPECIES OF GALERA

By F. S. Earle

Key to the Sections

1. Universal veil none, or very fugacious. 2.
   Universal veil subpersistent as fibrils on the margin and stipe. Eriodermae.
2. Pileus plicate-striate. Plicatellae.
   Pileus often striate but not plicate. 3.

3. Pileus somewhat fleshy, conic-campanulate, atomaceous when dry, even or striatulate; stipe strict; on dung, rotten wood, etc. CONOCEPHALAE.
Pileus membranaceous, campanulate, glabrous or subsericeous when dry; stipe thin, lax, flexile; among mosses. ERYOGENAE.

KEY TO THE SPECIES

Section CONOCEPHALAE

1. Pileus white. 2.
Pileus sordid flesh-color. *G. fragilis* Pk.
Pileus pallid. *G. macromastes* (Fr.) Sacc.
Pileus brownish or ochraceous. 3.

2. Stipe glabrous. *G. alba* Pk.
Stipe pruinose. *G. lateritia albicolor* Pk.

3. Stipe white or whitish. 4.
Stipe concolorous or subconcolorous. 8.

4. Pileus glabrous, striate. 5.
Pileus viscid, even; stipe glabrous. *G. angusticeps* Pk.

5. Pileus yellowish to ochraceous; stipe pruinose. 6.
Pileus chestnut; stipe striate-sulcate, silky. *G. sulcatipes* Pk.

6. Lamellae not crowded, much crisped and interveined. *G. crispa* Longyear
Lamellae crowded, not crisped or interveined. 7.

7. Color of pileus variable; lamellae red-ferruginous. *G. versicolor* Pk.
Color of pileus constant; lamellae fulvo-ferruginous. *G. lateritia* (Fr.) Gillet

8. Lamellae linear. 9.
Lamellae broad, often ventricose. 10.

9. Stipe 15 cm., twisted. *G. tortipes* (Mont.) Sacc.
Stipe 2–4 cm., not twisted. *G. teneroides* Pk.

10. Pileus 4–8 mm.; stipe filiform, 1 mm. thick or less. 11.
Pileus 1–3 cm.; stipe more than 1 mm. thick. 13.

11. Lamellae free (possibly a *Pluteolus*) *G. Martiana* (B. & C.) Sacc.
Lamellae adnate. 12.

12. Lamellae distant; pileus ferruginous. *G. capillaripes* Pk.
Lamellae somewhat crowded; pileus dark cinereous to ochraceous. *G. spartea* (Fr.) Gillet (?)
Lamellae crowded; pileus ochraceous. *G. tenera minor* Pk.

13. Pileus ferruginous. 14.
Pileus ochraceous. 16.

14. Pileus corrugated; lamellae subdistant. *G. inculta* Pk.
Pileus smooth; lamellae crowded. 15.

15. Spores 10–12 μ × 6 μ; pileus oval-campanulate. *G. ovalis* (Fr.) Gillet
Spores 12–15 μ × 6–10 μ; pileus conic-campanulate. *G. tenera obscurior* Pk.

16. Pileus and stipe erect-pubescent when moist. *G. tenera pilosella* (Pers.) Pk.
Pileus and stipe glabrous. 17.

17. Stipe cylindrical, base obtuse. *G. tenera* (Schaeff.) Gillet
Stipe radicating strongly at base. *G. antipoda* (Lasch) Gillet
Stipe conspicuously bulbous at base. *G. sphaerobasis* (Post) Karst.

Section Bryogenae

1. Stipe white or pallid. 2.
Stipe ochraceous, ferruginous, or darker. 4.
2. Pileus rugose-reticulate. *G. reticulata* Pk.
Pileus smooth. 3.
3. Lamellae narrow; stipe silky-fibrillose, apex pruinose. *G. bryophila* Pk.
Lamellae triangular; stipe glabrous. *G. aquatilis* (Fr.) Gillet
4. Pileus cinnamon or chestnut to ochraceous; stipe 10–15 cm. long. 5.
Pileus watery-cinnamon; stipe 4–6 cm. × 2 mm. *G. Bryorum* (Pers.) Sacc.
Pileus ferruginous-orange; stipe 2-3 cm. long. 6.
5. Pileus watery-cinnamon; veil scarcely developed. *G. Sphagnorum* (Pers.) Gillet
Pileus darker, often chestnut; veil strongly developed.
G. Sphagnorum velata Pk.
6. Stipe blackish-brown. *G. Hypnorum nigripes* Pk.
Stipe concolorous. 7.
7. Pileus obtuse or subpapillate. *G. Hypnorum* (Batsch) Gillet
Pileus strongly umbonate. *G. Hypnorum umbonata* Pk.

Section Plicatellae

1. Pileus reddish. *G. lirata* (B. & C.) Sacc.
Pileus silvery-brown. *G. striatula* Clements
Pileus yellow. 2.
Pileus ochraceous or fuscous. 3.
2. Lamellae crowded, narrow. *G. flava* Pk.
Lamellae distant, broad. *G. semilanceata* Pk.
3. Pileus viscid, pale sordid-fuscous. *G. crocospora* (B. & C.) Sacc.
Pileus glabrous, yellow to ochraceous. **G. plicatella** (Pk.) *
Pileus densely silky tomentose, ochraceous. *G. pulchra* Clements

Section Eriodermae

1. Pileus reddish-tawny; stipe reddish-brown. *G. rufipes* Pk.
(See also *Galera Sphagnorum velata* Pk. and *G. tenera pilosella* (Pers.) Pk.

AN IMPROVISED HORIZONTAL MICROSCOPE

By H. M. Richards

Horizontal microscopes, while very useful pieces of apparatus, may perhaps be regarded as one of the luxuries of a physiolog-

* *Agaricus coprinoides* Pk. Reg. Rept. **26**: 59. 1874. Not Corda.
Agaricus plicatellus Pk. Reg. Rept. **29**: 66. 1878.
Galera coprinoides Pk. Reg. Rept. **46**: 69. 1893.

ical laboratory. It is useful then to know of some substitute for the regulation model, a substitute which may be constructed from the usual apparatus which is found in the laboratory. Having had occasion to set up a number of them, I supplemented the instruments I had in the following manner. An ordinary stand,

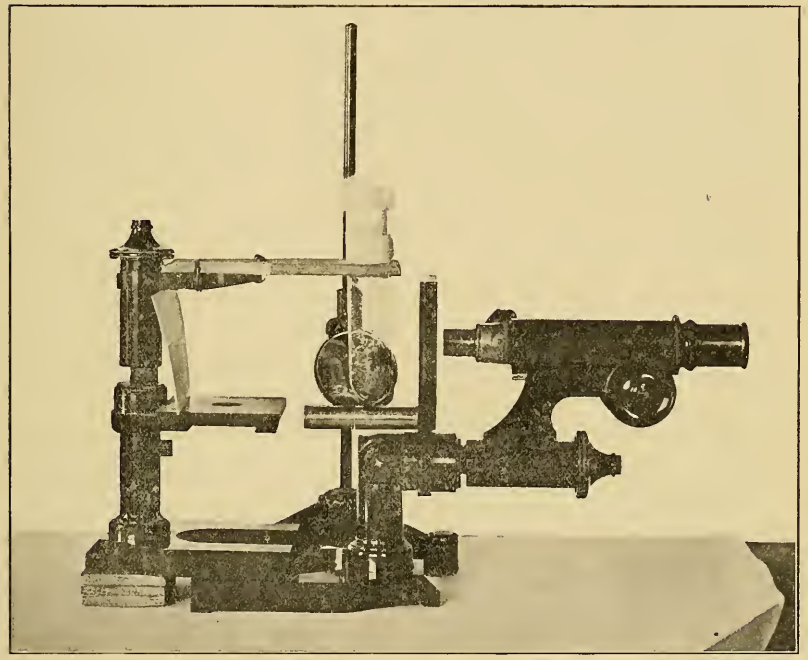

FIG. 1.

with a knee-joint, was inclined to the horizontal. This served as the horizontal microscope itself, after all of the substage apparatus had been removed, the front lens taken off from the No. 3 objective, and a micrometer ruling placed in the eye-piece. So far it is very simple and the idea, at best not a very remarkable one, might occur to any one. The chief difficulty, however, in constructing a horizontal microscope is to provide for the adjustment of the object to be measured, so that it can be brought in the desired position before the scale and so moreover it may be changed in vertical position without any lateral disturbance. Any

one who has tried this will recognize how difficult this seemingly simple operation is. In order to accomplish this successfully, a second microscope was taken (it happened to be an old model without rack and pinion), and was divested of its tube. On the arm a piece of wood was wired and the object-holder — in this case a test-tube — firmly fixed to it. The two microscopes were brought together as shown in the figure and constituted in combination a horizontal microscope. By means of the micrometer screw on the microscope carrying the object, its vertical position could be regulated to a nicety and both of the microscopes being level as to their bases, no errors other than those inherent in such instruments are met with. Of course if the object being measured is itself not vertical, the usual difficulties will be met with. One can only take the usual precautions against this.

A REMARKABLE PHYSALIS

By Robert F. Griggs

For nearly ten years the very peculiar *Physalis* described below has lain, undiscovered, in the National Herbarium. It had been labelled *Physalis Fendleri* but its flowers are five times smaller than in that species. Probably whoever made the first identification never saw the flowers at all and it is not to be wondered at that he did not for they would hardly be noticed except on careful search or by accident. It was by the latter that the writer found one of them after having previously examined the sheet more than once in connection with other work on the genus. Search revealed several more — all of the same degree of minuteness. There is but one sheet, but there seems to be no reason for supposing it to be a freak or abnormal in any respect as the fruits are entirely ordinary and like others of the genus. Hence the following name and description are offered.

Physalis minuta sp. nov.

Perennial from an underground stem, spreading, forming small tufts or mats on the ground; branches not more than 30 cm.

long, the larger 4-angled, glabrous, the smaller roundish, somewhat pubescent: leaves ovate, nearly entire, mostly rounded at both ends, often pubescent on the veins, sometimes all over, blade of the largest 17 mm. long, 10 mm. broad, mostly smaller (10 × 8 mm.); petiole shorter than the blade, generally pubescent with scattered hairs: peduncle at flowering time not more than 3 mm. long, fine-filiform: calyx shorter than the peduncle, frequently less than 1 mm. in longest dimension, longer than broad, tube longer than the teeth: corolla very small, about 2 mm. in diameter when fully expanded, darkened at the center; anthers purple: calyx in fruit about 15 mm. long, more or less 5-angled, teeth very short (less than 2 mm.) connivent; peduncle shorter than the calyx, very slender: berry yellow, much smaller than the calyx, 5 mm. in diameter when dry.

Acapulco, Mexico, Dr. Edward Palmer, winter of 1894–95, no. 304.

Physalis minuta belongs to the *crassifoliae;* its leaves have much the general appearance of *P. crassifolia*, to which undoubtedly it is closely related. It is, however, very different from that species in the very short, slender peduncles, the minute flowers and the connivent calyx-teeth. The size of the flower suggests affinity with *P. minutiflora* Moç. & Sessé but it differs at least in the entire leaves without any sign of being pruinose.

Dr. Palmer states that the fruit of this plant is sold all the year round in the markets of Acapulco for making soups, gravies and stuffing for fowls.

Columbus, Ohio.

TWO ORCHIDS FROM NEW MEXICO

By T. D. A. Cockerell

On June 17 and 18 of the present year, Dr. M. Grabham of Jamaica, West Indies, who was visiting me at Pecos, New Mexico, collected in the immediate vicinity two species of *Corallorhiza*, which he brought to me alive. After studying the specimens, they were put in press, and examples have been sent to the New York Botanical Garden, to which also the living roots were forwarded.

In my study of these orchids, I came to the conclusion that both were undescribed. One of them, however, has been recognized by Dr. Rydberg as his *C. Vreelandii*, described from Colorado. My failure to discover this was owing to the fact that by some mischance I overlooked his description, though I had it by me.

CORALLORHIZA VREELANDII Rydberg *

The following account of the living plant will be useful: Flowering stems 25 cm. high or less, with about 32 flowers or fewer: ovary 10–12 mm. long, about 4 mm. broad: peduncle extremely short: perianth directed forwards, not at all spreading, the whole inflorescence pale pinkish-yellow; sepals 3.5 mm. at base, gradually tapering to the apex, 9 mm. long, with four rather indistinct suffused longitudinal reddish stripes; petals similar but broad-lanceolate, about 8 mm. long, and 4 mm. broad in middle, rather obtuse, with three reddish stripes, stronger than those on the sepals; lip entire, ovate, the margins involuted, forming conspicuous marginal elevations at the base, below the column; in the middle line of the lip, at the bend, below the stigma, is a prominent swelling, inclined to be longitudinally bilobed; lip with three dark purplish-red longitudinal bands, meeting at the apex: column curved, light yellow at end: pollinia 4, orange; no spur.

Corallorhiza Grabhami sp. nov.

Stems about 40 cm. high, smooth and red: flowering spikes short, about 70 mm. long: sepals dark purplish-red, becoming pale at base, about 8 mm. long and 2.5 mm. broad; petals purplish-red at apex, and spotted with the same color within and at sides; column spotted or streaked; lip white with reddish-purple spots, but no streaks, lip shaped as in *C. Corallorhiza*, with small lateral lobes, but apical margin much wrinkled and crenulate and basal half with two strong elevated keels.

Allied to *C. multiflora*, but easily separated by the form of the lip.

C. Vreelandii was infested by an aphid, *Macrosiphum corallorhizae* (Ckll.). Dr. Grabham collected two other species of orchids at Pecos, namely *Cypripedium Veganum* Ckll. & Barker (unusually large), and *Limnorchis viridiflora* (Cham.)

* Bull. Torrey Club. 28: 271. My. 1901.

Rydb. Roots of *Cypripedium Veganum*, collected by Dr. Grabham at Beulah, N. M., have been sent to the New York Botanical Garden, and it is hoped that this fine species will flower there.

Pecos, New Mexico.

SHORTER NOTES

The Habitats of Polypodium polypodioides. — Mr. Pollard's note on *Polypodium polypodioides* and *P. vulgare* in the Plant World for July, 1902, recalls to my mind some observations on the same plants, especially on the places of growth selected by the first named species. I have observed *Polypodium polypodioides* at many stations, ranging from sea-level to almost 4,000 feet altitude on the eastern slopes of the Blue Ridge, and am convinced that the plant does not prefer trees to rocks, but that it is confined to trees only when rocks are lacking. I have found this *Polypodium* most abundant one or two hundred miles away from the coast. In the immediate vicinity of the coast and for some distance back where rocks do not occur, it is plentiful on trees, but when both rocks and trees occur together, at moderate altitudes, at least below 1,000 feet, it grows on both, but, as Mr. Pollard has observed near Washington, much more plentifully on the rocks. Localities where the plant behaves as it is described as doing at the Great Falls of the Potomac, are numerous from middle North Carolina to middle Georgia; for example, the Falls of the Yadkin River in the former State and banks of the Yellow River in the latter State. However, after ascending beyond 1,000 feet, in places where trees and rocks are equally plentiful, especially on the eastern slope of the Blue Ridge in North and South Carolina and Georgia, I have not noticed a single instance of its occurrence on a tree, while rocks and cliffs exposed to the south or east, and the sun, harbor quantities of the fern wherever it can gain a hold.

John K. Small.

CORRESPONDENCE

Duplicate Binomials

For over one hundred and fifty years the American Philosophical Society "held at Philadelphia" has been engaged in the laudable task of "promoting useful knowledge"; and, on the whole it must be admitted that its efforts have been crowned with success. What must be the surprise, however, of botanists and zoölogists everywhere when they learn of the latest proposition contained in the proceedings of this ancient body. On pages 263 and 264 of the current volume, "printed Aug. 7, 1903," we are favored with a contribution from the pen of an Italian scientist, the burden of which is indicated by the following quotations:

"In my note . . . published in the Bulletin of the Italian Malacological Society (Vol. x, 1884), I have proposed to retain the original Linnean names for the species, though this may have been chosen to denote the genus. For instance, the name of *Mya vulsella* L. . . . has been changed in *Vulsella lingulata.* The name of *Ostrea malleus* L. has been changed in *Malleus vulgaris* Lamk. I have proposed in similar cases to retain the original name of the species. . . . So I have proposed to call these species *Vulsella vulsella* (L.), *Malleus malleus* (L.). My proposition has been accepted by many malacologists. . . . I think that this modification might be conveniently adopted also for plants as well as animals. . . . I call the attention of zoölogists and botanists to this interesting innovation." [!]

Perhaps it is expecting too much of an Italian malacologist that he should be informed of the current usage of many American botanists, or even American zoölogists; perhaps he could not be expected to be familiar with Karsten's Deutsche Flora (1880–1883), with its eighty duplicate binomials (*Amelanchier Amelanchier*, *Archangelica Archangelica*, *Aruncus Aruncus*, *Batatas Batatas*, *Bellidiastrum Bellidiastrum*, *Calamagrostis Calamagrostis*, *Calamintha Calamintha*, *Camphora Camphora*, *Canella Canella*, etc.), or with Hill's Hortus Kewensis, published during the lifetime of Linnaeus, in which occur the names *Calcitrapa Calci-*

trapa, Cyanus Cyanus, Mariana Mariana, Rhapontica Rhapontica, and others of a similar character. But it must be a matter of surprise that the recent literature of botany and zoölogy is so slightly regarded (or so wholly inaccessible?) at Philadelphia; it seems, however, as if even there they must have a copy of the Century Dictionary, and if they consulted it might find the statement that the common European lynx is *Lynx Lynx!*

There has been much discussion among both zoölogists and botanists about the desirability of using duplicate binomials, and there are still many who object to scientific names which are as meaningless as "cat cat" or "dog dog," but the use of such appears to be extending in spite of objections, and they are no more devoid of meaning than many other binomials in common use.

While upon this subject, it may not be amiss to call the attention of botanical students to the fact that many duplicate binomials were proposed by A. B. Lyons in 1900, in his little book entitled "Plant names, scientific and popular"; a work which might readily be overlooked as a source of new combinations.

John Hendley Barnhart.

NEWS ITEMS

John L. Sheldon, Ph.D. (University of Nebraska, 1903), has been appointed professor of bacteriology in the West Virginia University at Morgantown.

Dr. and Mrs. N. L. Britton returned to New York on September 18 from Cuba, where they had spent three weeks in botanical exploration.

Mr. C. B. Robinson, B.A. (Dalhousie, 1891), of Pictou, Nova Scotia, has been appointed a laboratory assistant at the New York Botanical Garden.

Mr. Edmund P. Sheldon, now of Portland, Oregon, is superintendent of the Oregon State forestry exhibit at the World's Fair, St. Louis, 1904.

Professor L. M. Underwood returned from Europe on September 7. While abroad he visited herbaria at Kew, Berlin, Prague, Basel, Geneva, Paris, etc.

Mr. C. F. Baker, who received the degree of master of arts from Stanford University last spring, has been appointed assistant professor of biology in Pomona College, Claremont, California.

Mr. Robert S. Williams, of the New York Botanical Garden, started on August 30 for Manila. He plans to devote a year or more to making collections for the Garden in the Philippine Islands.

Mr. Charles Louis Pollard, for several years connected with the botanical department of the United States National Museum, has resigned to accept a position on the scientific staff of Webster's Dictionary.

After September 15, the permanent address of Mr. A. A. Heller, the well-known botanical collector, who has been working in California for the past year, will be Los Gatos, Santa Clara County, California.

Professor Francis E. Lloyd, of Teachers College, Columbia University, and Mrs. Lloyd, returned on September 7 from a ten weeks' visit to the island of Dominica of the British West Indies. They spent a short time also on the islands of Martinique and St. Lucia.

Messrs. George V. Nash and Harry Baker, of the New York Botanical Garden, returned on September 14, from a seven weeks' visit to Haïti. Collections of living plants and herbarium specimens were made by them in the mountainous region of the northwestern part of the island, mostly to the westward of Cape Haïtien.

Dr. W. A. Cannon, recently fellow in botany in Columbia University and assistant in the laboratories of the New York Botanical Garden, left New York on August 21 to assume his new duties as director of the Desert Botanical Laboratory of the Carnegie Institution at Tucson, Arizona. The building which has been erected for this laboratory is now practically completed.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

Of former volumes, only 1–6 and 19–29 can be supplied entire from the stock in hand, but the completion of sets will be undertaken. Yearly volumes 1–5 (1870–1874), one dollar each. Vol. 6 (1875–1879), extending over five years, is furnished at the subscription price of five dollars. Vols. 19–29 (1882–1902) are furnished at the published price of two dollars each; Vols. 28 and 29, three dollars each.

Single copies (30 cts.) will be furnished only when not breaking complete volumes.

(2) MEMOIRS

The MEMOIRS are published at irregular intervals. Volumes 1–11 are now completed and No. 1 of Vol. 12 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1796–1873

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TORREYA

October, 1903

THE EARLY WRITERS ON FERNS AND THEIR COLLECTIONS.—I. LINNAEUS, 1707–1778

BY L. M. UNDERWOOD

A little two-volume leather-bound book bearing on its title-page the words, *Species Plantarum*, 1753, has now become quite rare from the demands made since the Berlin, Rochester, and Genoa decisions of 1892 made it the starting point of botanical nomenclature. Many people still hold the erroneous opinion that Linnaeus was the originator of binominal nomenclature. The first book to figure American ferns was published in 1635,* nearly a hundred years before Linnaeus published a line, and gave illustrations and descriptions of two of our American species, calling them *Filix baccifera* and *Adiantum Americanum*, names which by right they should bear instead of those adopted a hundred and eighteen years later by Linnaeus. The same work included many other binomial names some of which, like *Asaron Canadense*, are the names the plants still bear. In *Species Plantarum* Linnaeus simply brought together in a compact and usable form a condensation of the enormous mass of botanical publication that preceded him and reduced the whole to a system which though artificial is readily accessible, which fact has invested his volumes with an importance perhaps greater than that of any other single botanical work.

The ferns and fern allies of Linnaeus were grouped under two of the major divisions of his *Class XXIV. Cryptogamia*, FILICES and MUSCI ; the genera recognized, with the number and distribution of species may be seen from the following table :

*CORNUT. Canadensium plantarum * * * Historia. Paris, 1635.

[Vol. 3, No. 9, of TORREYA, comprising pages 129–144, was issued September 6, 1903.]

Genera	Total Species	Europe	Asia	Africa	Temperate America	Tropical America	Common to U. S. and Europe
Filices.							
Equisetum.	6	6	—	—	—	—	—
Onoclea.	1	—	—	—	1	—	—
Ophioglossum.	6	2	2	—	—	2	—
Osmunda.	17	5	1	—	4	8	—
Acrostichum.	25	5	6	3	3	10	—
Pteris.	19	1	3	—	1	15	—
Blechnum.	2	—	1	—	—	1	—
Hemionitis.	2	—	—	—	—	2	—
Lonchitis.	3	—	—	—	—	3	—
Asplenium.	20	9	2	—	1	10	—
Polypodium.	58	15	9	—	5	29	2
Adiantum.	15	1	3	1	1	9	—
Trichomanes.	11	2	3	2	—	6	—
Marsilea.	2	2	—	—	—	—	—
Pilularia.	1	1	—	—	—	—	—
Isoetes.	1	1	—	—	—	—	—
Musci.							
Lycopodium.	24	9	7	—	6	4	1
Total.	213	59	37	6	22	99	3

While the above will show that the genera outlined by Linnaeus are commonly recognized genera of to-day, the sense in which he conceived them was far different from our present conception except in the case of the genera *Equisetum*, *Onoclea*, *Blechnum*, and *Adiantum*, which were composed wholly of species still within those genera as now accepted. *Ophioglossum*, based on the familiar adder-tongue fern of Europe, which had been known as *Ophioglossum vulgatum* at least since the publication of Bauhin's *Pinax* (1671), also included the tropical *Cheiroglossa* and two Asiatic species of climbing ferns (*Lygodium*). *Osmunda* was still more of a mixture and included nearly everything known to Linnaeus which had a semblance of a panicle, although the royal flowering fern common in Europe was clearly the historic type of the genus. The genus *Osmunda* of Linnaeus contained what are now distributed amoung four families representing two distinct orders of plants, viz. : *Helminthostachys* and two species of *Botrychium* (Ophioglossaceae); four species of *Ornithopteris* and *Anemia* (Schizaeaceae); four species of *Osmunda* proper (Osmundaceae), one species each in *Matteuccia*, *Struthiopteris*, *Olfersia*, and *Cryptogramma* (Polypodiaceae) besides one tropical American species not yet identified.

Acrostichum as outlined by Linnaeus contained ferns having the sporangia scattered in a layer over the under surface of the leaf, and in separating the members of this group, he did not distinguish those which have distinct sori when young which later become confluent. Without these his genus formed a sufficiently unnatural group, containing as it did species of *Schizaea*, *Danaea*, *Stenochlaena*, *Ceratopteris*, *Hymenodium*, and *Todea* in addition to *Acrostichum aureum*, the type of the genus, and to these were added *Polypodium polypodioides*, *Asplenium platyneuron*, *Asplenium septentrionale*, *Lorinseria areolata*, *Woodsia Ilvensis* and *Dryopteris Thelypteris* by way of variety, together with species of *Notholaena*, *Trismeria*, and *Ceropteris*. Should anyone suppose that the fern system of the miscalled "Father of Botany" was anything but crude even for the time at which it was proposed, the contemplation of this array of misfits should serve as convincing evidence to the contrary.

The genus *Pteris* in the *Species Plantarum* is a little better although it contained members of the genera *Vittaria*, *Notholaena*, *Gymnopteris*, *Dryopteris*, *Pteridium*, *Dicranopteris*, and *Pellaea* as now recognized, in addition to species which still help to make up the genus *Pteris* with a single continuous marginal indusium and free veins. *Asplenium* was a somewhat more natural aggregate commencing with the single-leaved species of *Camptosorus*, *Phyllitis*, and *Thamnopteris*, and passing on to *Ceterach* and the more divided members of the genus *Asplenium*, now distributed among several genera but, with perhaps a single exception, all members of the tribe *Asplenieae* as now recognized. A serious relapse occurred again in *Polypodium* which included all the species with rounded sori whether indusiate or not; besides representatives of the various genera still included under *Polypodium* in certain quarters, *Polypodium* of *Species Plantarum* contained species of *Tectaria*, *Polystichum*, and *Phegopteris* together with *Asplenium fontanum*, *A. filix-foemina*, several species of *Dryopteris*, including *D. filix-mas*, *D. cristata*, *D. Noveboracensis*, and *D. marginalis*, *Filix bulbifera* and *F. fragilis*, *Cibotium Barometz*, *Cyathea arborea*, *Hemitelia horrida*, *Alsophila aspera*, and others equally diverse in character.

The genus *Trichomanes* whose name Linnaeus transferred from our little tufted spleenwort to the tropical filmies, included some species of *Hymenophyllum* and at least one *Davallia*. *Marsilea* included *Salvinia natans* and *Marsilea quadrifolia*, now recognized as types of two different families of the *Salviniales*, and *Pilularia* and *Isoetes* were monotypic, each including the more common species of northern Europe.

It was perhaps natural for *Lycopodium* with narrow leaves to have been associated with the leafy mosses under MUSCI, but it was strange that the foliose hepatics with the single exception of *Porella* should have been placed apart under ALGAE. The genus *Lycopodium* of *Species Plantarum* contains twelve species still included under the genus, together with *Psilotum nudum* and eleven species of *Selaginella*.

It is highly improbable that Linnaeus knew many of the pteridophytes which he arranged in this work, save the few with which he was familiar in northern Europe. By far the greater number of his species were compiled from books and his only knowledge came from the more or less accurate illustrations with which he was familiar.

The apparently undue proportion of tropical American species was due to the early works of Plumier and Sloane, which had been copied by Petiver and probably by Plukenet. Sir Hans Sloane collected extensively in Jamaica toward the close of the seventeenth century, and Charles Plumier collected in Santo Domingo and Martinique at about the same time. The elaborate folio works of these two early writers form the foundation of our knowledge of West Indian botany, and while they were digested by Linnaeus only in part, they furnished him the basis for his species of West India ferns. Later writers have traced many additional species to the same early sources that Linnaeus only skimmed, but did not fathom or comprehend.

Linnaeus' herbarium was probably made, at least in great part, after the publication of the first edition of *Species Plantarum*, and on that account is of comparatively little value for the determination of his types. It is preserved at London in the rooms of the Linnaean Society. After the death of Linnaeus' son, the collection

reverted to the widow of Linnaeus by whom it was sold to Sir J. E. Smith, for many years president of the Linnaean Society. After Smith's death it was purchased with other collections for the Linnaean Society at a sum that almost paralyzed the society for a quarter of a century. The plants are in an excellent state of preservation and are on sheets about the size of small foolscap paper. The sheets of each genus are protected by heavy wrappers which entirely enclose the packets; the genera are systematically arranged in the original cases in which Linnaeus left them, protected by clumsy Swedish locks, and these cases are again placed in others still larger with glass fronts which stand in the assembly room of the Society.

During the past summer we examined the plants of the genera *Osmunda*, *Acrostichum*, and *Polypodium* and found the material scrappy, often consisting of mere tips of leaves, rarely with any rootstocks, and often wholly sterile. Only a small part of his species are represented by specimens at all, and those that are often do not correspond with the species described in his works. Two instances will show the nature of the discrepancies:

Under *Osmunda Lunaria* (= *Botrychium Lunaria*) the only plant preserved is one of *Botrychium matricariae*.

Under *Osmunda bipinnata*, a West Indian species described from Plumier's plate which represents a very close ally of *Osmunda cinnamomea*, the only plant is one of *Ornithopteris cicutaria* (Kze.), a plant bearing no resemblance to Plumier's plate! Moore, who made this same discovery, promptly transferred *Anemia cicutaria* Kze. to *Anemia bipinnata* (L.) Moore and the name was as promptly adopted in *Species Filicum* at Kew for this species, a proceeding that cannot hold for manifest reasons. The types of Linnaeus must very largely depend on the plates and descriptions of the early writers from which he quoted. Of these there are twenty-seven works containing descriptions of extra-European ferns from which Linnaeus made citations, to say nothing of thirty-five or more European herbals which were also cited. Considering the number of ferns named by Linnaeus, his original contribution to the knowledge of them was very limited, although he did describe a few species from plants collected by

Kalm in America and by Osbeck in China, and he must ever plead guilty to the charge of needlessly changing names already given by his predecessors.

A NOTE ON THE "FLOWERING" OF THE LAKES IN THE ADIRONDACKS

By Marshall A. Howe

In the spring of 1902, Mrs. Annie Morrill Smith, of Brooklyn, sent me for determination a small alga, which in the very full notes accompanying the communication, she stated to be chiefly responsible for the phenomenon known to the guides of the Adirondack region as the "flowering" or "blossoming" of the lakes. A portion of Mrs. Smith's letter runs as follows:

"I spent the summers of 1891, 1892, and 1893 at Honnedaga Lake, Herkimer County, N. Y., on the Adirondack League Club Tract. The altitude is about 2,200 feet, or possibly 2,400 feet. On the 14th of August of each year we noticed for the first time the water of the lake filled with golden globules so plenty that a glass slowly lowered and withdrawn was clouded. Microscopic examination at the time convinced me (though without books of reference) that it was an alga. It continued plenty as long as we were at Honnedaga, about September 1st each year, how much longer I could not say. At Little Moose Lake, at the northern end of the Club Tract, I made inquiry as to the appearance of the alga, which I may say the guides on all the Club Tract call 'the flowering or blossoming of the lake,' and they all assured me it was never to be seen in Little Moose Lake, though all knew it in Honnedaga and other of the lakes of the tract. While at Chilson Lake [Essex County] in 1901, I asked Mrs. Harris if she had ever noticed such a phenomenon and found that they had seen something of the kind but attributed it to the fall on the lake-surface of the pollen of trees or other plants. This is entirely different, as this last rises to the surface while the alga is more plenty below the surface and never rises

or gives the look of scum as the pollen does. During my visit to Chilson Lake in 1901, going as I did in the middle of May, I kept the phenomenon in mind and was on the watch for it, and singularly enough it was on the 14th day of August that I first saw it. Water was taken and slides made. I left the lake September 15th, making slides from water taken on the 7th. How much longer the alga continued I cannot say."

Further observations by Mrs. Smith at Chilson Lake in the summers of 1902 and 1903 indicate, as might be suspected, that the interesting little alga has no fixed prejudices for the 14th of August as the date for its initial appearance. In 1902, it was first seen on July 26 and Mrs. Smith writes that in 1903 "it was in the lake June 6 when we arrived."

The alga in question, judging from well preserved specimens from Chilson Lake, collected by Mrs. Smith at various times in the summers of 1901 and 1902, is apparently the plant known to some as *Rivularia echinulata* (Sm.) or *Rivularia fluitans* Cohn, to others as *Gloiotrichia Pisum* (Ag.) Thuret, and more recently, as *Gloiotrichia echinulata* (Sm.) P. Richt. It may be remarked, in passing, that the generic names *Rivularia* and *Gloiotrichia*, in their current sense, are both invalid under the provisions of the Paris and Rochester codes, but a note like the present is hardly the place for introducing names that may be new or unfamiliar. The Chilson Lake plants form small colonies mostly about 1 mm. in diameter, but ranging from 0.5 mm. to 1.5 mm. These colonies are usually spherical, rarely reniform or somewhat horseshoe-shaped. The color in mass, when suspended in a fluid (a mixture of one per cent. chrome-alum and one per cent. commercial formalin was used for preservative) is a light bluish-green. In the younger stages, the radiating whip-like filaments which form the colonies are easily separable, but as the colonies get older and the filaments become more numerous, the globular masses become firmer in consistency and the component parts do not separate readily under pressure. Unfortunately, no spores (or, at most, only slight suggestions of the beginning of spore-formation) have been found, though Mrs. Smith's collections were made as late as September 7, in 1901; and the determina-

tion of the plant therefore remains less satisfactory than might be the case were spores present. However, aside from the absence of spores the agreement is close between the Chilson Lake plants and German specimens (from the biological station at Plön), distributed as No. 587 of the Phykotheka universalis of Hauck and Richter under the name *Gloiotrichia echinulata*. The most striking difference noticed in comparing fluid-preserved materials of the Chilson plant with the dried specimens issued under this No. 587 and the figures accompanying this number is the greater development of terminal hairs of the Chilson specimens. The length of these nearly colorless hairs is commonly greater than the whole diameter of the darker and denser central portion of the sphere. But the delicate terminal portion of the hair does not preserve well in drying and the difference is less striking, though still apparent, when dried specimens of the two are compared. However, the length of the hair varies with the age of the colony and in certain stages the hairs may be entirely wanting. The colonies evidently multiply very rapidly through the agency of hormogonia and before a filament breaks up into these hormogonia, the terminal hair-like part falls off.

The *Gloiotrichia echinulata* is accompanied by a relatively small quantity of a spore-bearing *Anabaena*, another alga belonging also to the blue-green class. The *Anabaena* forms still more minute colonies, which are of a yellowish color.

The "flowering" or "blossoming" of lakes, due to the alga *Gloiotrichia echinulata* and exhibiting the phenomena observed by Mrs. Smith, does not seem to have been recorded, so far as the writer can discover, for the eastern portion of North America. But it appears to be common in Minnesota and has been reported also from Wisconsin.* In the years 1882–1884, Professor J. C. Arthur was called upon to investigate the cause of the mysterious death of domestic animals in the State of Minnesota, supposed to have resulted from the drinking of water at a time when it was

* Trelease, Trans. Wis. Acad. Sci. 7: 121–129. 1888.

Probably Michigan also should be included, for Campbell mentions "*Rivularia echinata* Eng. Bot." in a list of plants of the Detroit River (Bull. Torrey Club, 13: 93. 1886).

filled with a minute alga. Several notes and papers reporting the progress of the investigations were published, the principal of these being a paper on "Some Algae of Minnesota, supposed to be Poisonous," printed in the Bulletin of the Minnesota Academy of Natural Sciences (3: 97–103. 1885). Direct experiments in the way of allowing thirsty animals to drink of water well charged with the alga were followed by no bad results, so that the general conclusion was "that the death of the animals is probably not due to the suspected algae and that no clue to the real cause has yet been obtained." Mrs. Smith states that no reports of any poisonous action of the algae at the time of the "flowering" of the Adirondack lakes have come to her attention. The Minnesota alga was first referred to *Rivularia fluitans*, but later, following the opinion of Bornet, it was called *Gloiotrichia Pisum*. Subsequently Bornet and Flahault * included *Rivularia fluitans* in the synonymy of *Gloiotrichia Pisum*.

Through the courtesy of Professor Farlow the writer has seen a specimen of the Minnesota plant collected by him in Lake Minnetonka in August, 1883, and a comparison of this with the Chilson Lake specimens affords no ground for suspicion that the two are not the same species, though the former is spore-bearing and the latter are not.

In 1888, Professor Trelease, in a paper entitled "The 'Working' of the Madison Lakes," † refers to *Gloiotrichia Pisum* as one of several blue-green algae which are responsible for the "working" of the lakes in the vicinity of Madison, Wisconsin. A considerable bibliography of this interesting subject is appended to Professor Trelease's paper and to this the reader may be referred for citations of literature which need not be repeated here. The phenomenon is well known in England as the "breaking of the meres" and in Germany as "Wasserblüthe."

In 1894, Richter contended for the specific separation ‡ of *Gloiotrichia echinulata* (Sm.) P. Richt. and *G. Pisum* (Ag.) Thuret and a little later in the same year § wrote *Rivularia fluitans* as a

* Ann. Sci. Nat. VII. 4: 366. 1886.

† Trans. Wis. Acad. Sci. 7: 121–129. 1888.

‡ Forschungsber. Biol. Sta. Plön, 2: 31–47. 1894.

§ Hauck and Richter, Phyk. Univ. Fasc. XII., No. 587. 1894.

synonym of *Gloiotrichia echinulata*. Richter's distinction of *Gloiotrichia echinulata* and *G. Pisum* is adopted by Kirchner in Engler & Prantl's Pflanzenfamilien (1^{1a}: 90. 1898).

Dr. A. Schmidt, in a paper * known to the writer only through a notice in Just's Jahresbericht,† protests against Richter's union of *Rivularia fluitans* and *Gloiotrichia echinulata*. Some remarks on *Rivularia fluitans* by Dr. Schmidt are published in the Verhandlungen des Botanischen Vereins der Provinz Brandenburg for 1897 (39: xxxi–xxxiv).

"Observations upon some Algae which cause 'Water Bloom'" ‡ is the title of a recent paper by N. P. B. Nelson, dealing with the plants concerned in "water-bloom" as it occurs in Minnesota.

It is to be hoped that subsequent collections of the supposed *Gloiotrichia echinulata* in the Adirondack region may result in securing spore-bearing specimens, which will afford a more satisfactory basis for comparison with closely related or identical forms of Europe and of our western States.

EXCERPTS FROM DR. OTTO KUNTZE'S NOMENCLATURAE BOTANICAE CODEX BREVIS MATURUS §

It is a pity that our American botanical friends of U. S. A. practice promptly their new inconsiderate rules and neglect afterwards contrary facts. Thus they maintain their Rochester resolutions, although I proved in my Rev. III^{II}, § 28–30, that 20,000–30,000 names were still to be changed by these resolutions, which they, contrary to scientific principles, will not do. Formerly the Bulletin of the Torrey Botanical Club reported always about my Revisio gen. I/II, III^{I}, but about my Revisio

* Schrift. naturf. Ges. Danzig, 9: 27–31. 1898.

† Bot. Jahresb. 26^{1}: 294. 1900.

‡ Minn. Bot. Studies, 3: 51–56. *pl. 14.* 1903.

§ Nomenclaturae botanicae codex brevis maturus sensu codicis emendati aux Lois de la nomenclature botanique de Paris de 1867 linguis internationalibus: Anglica, gallica, germanica quoad nomina latina, auctore Otto Kuntze. Stuttgart, 1903. [Excerpts from English version, pp. XLVII–XLVIII, LV–LVII.]

III[II], indicating the facts against the Rochester resolutions, which I had sent them *ad referendum*, they did not refer. Then Professor Underwood abstained from all reports and critics in Bull. Torr. Club. But lately, in another publication of that Club, Torreya, such reports and critiques have begun anew, and the editors of the Bulletin having been changed, there is hope of amelioration and revocation of their incapable Rochester resolutions.

* * * * * * * * * *

It may not be forgotten that there is now more danger than ever for the international nomenclature by four cliques.

1. The clique of Engler, who scoffs at the regulation by a Congress (Rev. gen. III[II], page 68) renouncing to have his rules sanctioned by a "so-called" general botanic Congress. Nevertheless he was "elected" with eight of his collaborators into the second international commission for the Congress, though by a mysterious manner. One of his collaborators (Briquet) has caused or participated to the arrangement of that falsified commission, and another of his collaborators (R. von Wettstein) has caused or participated to give illegal right of voting to the members of this commission in favor of Engler. English and American botanists did not receive the circulars for the Congress in English language and were thus repulsed from a Congress that could thereby become partial. See also ABZ. 1902 : 164.

2. The Kew clique, which recognizes only the Kew Index. The present director of the Royal Kew Herbarium and Gardens, Sir William Thiselton Dyer, is perfectly innocent as to the servile Kew Index with its Kew obscuration principle and Kew falsification principle (see note 27, page xlviii), because Sir William never was a collaborator of the Kew Index. Even he declared its names as no standard ones. In a presidential address given at Ipswich in 1895 in the botanic section of the British Association (see Journal of Botany, 1896 : 306), he had proclaimed : "It is a mistake to suppose that the Kew Index expresses any opinion as to the validity of the names themselves." But when I invited him to attach himself to international tendencies of nomenclature I received the strange answer : "We have our own nomencla-

ture." Thereby he comes in contradiction with himself and his former proclamation. Likewise Mr. D. Jackson and Mr. Th. Durand, as editors of the supplement to the Kew Index, refuse in its prospectus to acknowledge the nomenclature of the Index Kewensis. That index is only a good work for quotations with a systematic somewhat out of date, but with slight value as to nomenclature. In the new supplements all misnames of plants from all authors are quoted without but all from the bulk of such misnames given by Jackson and by Durand; that is also not in harmony with scientific exactitude. Moreover, the Kew Index is pretty unreliable and incomplete. (See Journal of Botany, 1896: 298–307; Deutsche bot. Wochenschrift, 1899: 4–7; Allgemeine Botan. Zeitschrift, 1902: 98 bis 100, 1903: 101–105; Botan. Centralblatt, XC: 685.)

3. The French clique Malinvaud-Le Jolis-Levier, who tried to charm away the priority out of the Paris Code (see Rev. gen. III[II]: 13–14, 25–30, 43–58); but the priority is the base of that Code. One of these nomenclature-charmers Mr. Malinvaud, general secretary of the botanic society of France has caused (see Le Monde des Plantes, 1903: 21) that this society did not participate of the international commission for nomenclature "and that it has no part with an artificial agitation which menaces to end with the bankrupt of the laws of nomenclature." Well, it would scarcely be possible to expose more to shame these laws and the botanic society of France as Mr. Malinvaud has done it. Indeed that society as godmother of these laws of 1867 is obliged morally to take care of the further existence of these laws, which she has caused; but that will be impossible with Mr. Malinvaud, for that would be to set the fox to keep one's geese. The botanic society of France is rather obliged to participate directly of a reformation of the laws of botanical nomenclature. That these laws not be needy of reformation can only be pretended by men who do not know these laws by practice.

4. The clique of some Americans (see note 24) who maintain their inexecutable Rochester resolutions although it is proved that by these rules still 20,000–30,000 names are to be changed (see Rev. gen. III[II] p. CCLXIV and III[II]: 134–153 of the intro-

duction). If these American botanists would not attach themselves to international order, we can speak of a botanical Tammany-ring.

51*b*. Another perverter of nomenclature mentioned sub 51[3] Dr. E. Levier, who even was elected — it is not known with how few votes and by whom — into the international commission, has discharged against me a pamphlet of 12 narrow printed pages, after that his last furious articles were refused from the Bulletin de l'herbier Boissier et from the Botan. Centralblatt.

I renounce, of course, to enter in details; I want only to hang deeper that pamphlet, as he had it sent to the members of the international commission and to my friends, such I could look in it. That doctor, whose capacity in nomenclature is to be seen by the fact that he, notwithstanding his interminable tittletattle, could not join an only paragraph to the laws, that doctor pretends that I had called him a "Schafskopf" (sheep's head). But the matter is, that he in a letter conditionally to be published had called himself a "Schafskopf," which denomination he falsified afterwards into "Schäfer" (shepherd) in the Botan. Centralblatt (see Rev. gen. III[II]: 55). The conditions for the publication were honestly realized by him. I recognize therefore his honesty if arriving. But I had characterized him l. c. 58 as a Verdreh-Genie (genius in perverting), about which he prudently was silent.

In the combats that myself as the principal defender of the Paris Code had to fight since ten years against the widely spread corruption in botany, I met not rarely with such malefactors; their just and strong designation was only duty. That such designations occur several times is no wonder and nevermind a disculpation for a single malefactor.

A NEW GENUS OF NORTH AMERICAN UMBELLIFERAE

By Kenneth K. Mackenzie

While botanizing last August on Kate's Mountain near White Sulphur Springs, West Virginia, I noticed a plant which I took to be *Taenidia integerrima* (L.) Drude. As this is a common plant I did not make any specimens at the time. A few days later, however, on another part of the same mountain I saw another plant, which also seemed to be *Taenidia integerrima* but the fruit of which did not correspond to my recollection of the fruit of the first plant. This led me to investigate and get specimens of both plants. When put side by side the difference in the fruits was at once noticeable. In fact the fruits represent two very widely separated types of umbelliferous fruits, and are almost as distinct from one another as two umbelliferous fruits can well be, but outside of the fruits the two plants are apparently identical. The second plant discovered proved to be genuine *Taenidia integerrima* (L.) Drude, and the first I venture to characterize generically and specifically as follows :

Pseudotaenidia gen. nov.

Glabrous and glaucous erect perennials from stout horizontal to perpendicular rootstocks. Leaves ternately decompound, the leaflets entire. Umbels borne on terminal and lateral peduncles, compound, the rays very unequal in length. Involucre and involucels none or rarely of one or two bractlets. Corolla not seen.* Calyx-teeth short, but evident. Fruit thick, strongly flattened dorsally, oval or obovate, glabrous. Dorsal and intermediate ribs of carpel filiform and very much narrower than the intervals, coming together at base and apex to form short prominent ridges ; lateral ribs thick, broadly winged and contiguous to those of the other carpel so as to form a broad one-edged margin around the fruit, nerved dorsally at the inner margin and also near the outer margin. Oil-tubes solitary in the intervals or often two in the intervals nearest the lateral ribs ; two entirely developed and two partially developed on the commissural side.

* Almost certainly yellow.

Top of fruit thickened by the converging ribs, but stylopodium absent or much depressed. Seed-face plane, the back rounded.

Pseudotaenidia montana sp. nov.

Plant 4–8 dm. high, entirely glabrous : stems striate : leaves several, the blades two or three times ternately compound ; the segments entire, ovate or oblong-lanceolate, oval, or oblanceolate, glaucous and strongly veined beneath, sessile or stalked, 10–30 mm. long, 6–20 mm. wide, mucronate, often inequilateral at base ; petioles dilated at base, striate and clasping the stem : peduncles 6–20 cm. long ; rays of umbels 8–12, 1–5 cm. long ; rays of umbellets usually slightly more numerous, 3–7 mm. long : fruit 5–6 mm. long, 4 mm. wide, the lateral ribs 1 mm. wide.

The plant exactly resembles *Taenidia integerrima* (L.) Drude in everything except the fruit.

Type collected by myself on Kate's Mountain, White Sulphur Springs, West Virginia, August 29, 1903, in dry open woods on the mountain-side in a clayey soil intermixed with loose rocks ; *Taenidia integerrima* grows in similar situations on the same mountain, but so far as I saw in separate patches. Both plants were rather common. The only other specimen of this plant seen by me is in the Herbarium of the New York Botanical Garden and was collected by E. S. Steele, on Aug. 20, 1901, near Luray Cavern, Virginia. Type specimens are deposited in my herbarium and in the herbarium of the New York Botanical Garden.

This genus has many of the fruit characteristics of *Oxypolis* or *Pastinaca* and technically probably belongs near them. A reference to them or their allies, however, is forbidden by the leaf-characters of this genus, as well as by several fruit-characters. In fact, a reference to either of these genera or their allies would be about as satisfactory as was the reference of *Taenidia integerrima* (L.) Drude to *Zizia* Koch or *Pimpinella* L.

In conclusion, I wish to thank Dr. N. L. Britton, who has gone over this plant with me, and I am glad to say agrees with my conclusions.

NEWS ITEMS

Dr. John K. Small, curator of the museums and herbarium of the New York Botanical Garden, left New York on October 25 for a month's collecting trip to southern Florida.

We regret to announce the death, on October 1, of Mr. Cornelius Van Brunt, a well-known member of the Torrey Botanical Club. It is expected that an account of Mr. Van Brunt's life and work will be published in a later number of this journal.

Dr. Arthur Hollick, assistant curator at the New York Botanical Garden, returned to New York on September 10 after spending the summer in making palaeobotanical collections and studies in Alaska, under the direction of the U. S. Geological Survey. His party went by way of the White Pass from Skagway to Dawson. From Dawson they floated down the Yukon River by canoe to Anvik, a distance of about 1,200 miles.

Among the botanical visitors in New York since July 1 have been William R. Maxon and Charles Louis Pollard, of the U. S. National Museum, Washington, D. C.; P. L. Ricker, Charles F. Wheeler, and Mrs. Flora W. Patterson, of the Bureau of Plant Industry, Washington, D. C.; Dr. H. N. Whitford and Dr. Burton E. Livingston, of the University of Chicago; Professor H. Harold Hume, Lake City, Florida; Professor William A. Setchell, University of California, Berkeley, Calif.; Professor K. M. Wiegand, Cornell University, Ithaca, N. Y.; C. Otto Rosendahl, University of Minnesota, Minneapolis, Minn.; Professor Andrew C. Moore, South Carolina College, Columbia, S. C.; Professor William L. Bray, University of Texas, Austin, Tex.; Dr. John W. Harshberger, University of Pennsylvania, Philadelphia; Professor P. H. Rolfs, Miami, Florida; Professor J. C. Arthur, Purdue University, Lafayette, Indiana; H. C. Irish, Missouri Botanical Garden, St. Louis; Sir Daniel Morris, Barbados, W. I.; Dr. Max Fleischer, Berlin; and Mr. A. A. Eaton, Ames Botanical Laboratory, North Easton, Mass.

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(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

MARSHALL AVERY HOWE

JOHN TORREY, 1790–1873

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TORREYA

November, 1903

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THE FERNS OF THE ORGAN MOUNTAINS

By E. O. Wooton

Lying as they do some twelve miles east of the Mesilla Valley, it has been my privilege and great pleasure to visit the Organ Mountains of southern New Mexico at practically all seasons of the year and thus to become very thoroughly acquainted with their flora. A number of years of study and field contact with the flora of New Mexico in general has made me quite conversant with its plants.

Perhaps the most striking characteristic of the flora of these mountains as compared with that of the Territory is the relatively large number of ferns growing there. Of the total number of ferns reported for New Mexico (30 species and 2 varieties)*, I have collected 23 species and 2 varieties, and of this number 19 species and the 2 varieties are to be found in the Organ Mountains. In no other mountains of the Territory have I found more than 6 species, though I have visited a number of ranges on horseback or in a wagon. This difference in the abundance of ferns is all the more noticeable because the Organs are dry, rocky, and warm, while the Sacramento and Mogollon mountains are both more or less heavily timbered and watered, thus affording those cool, damp nooks that ferns particularly delight in.

The difference in number of species in favor of the Organs may be in part accounted for by the thoroughness with which I have

*The Pteridophyta of North America, north of Mexico. Linnaean Fern Bulletin, No. 9. 1895.

[Vol. 3, No. 10, of Torreya, comprising pages 145–160, was issued October 30, 1903. For date of issue of No. 9 (footnote, p. 145) *read* September 26 *instead of* September 6.]

examined the region. I hardly believe this is the correct explanation since the last ten years of collecting in these mountains have added but two species which were not collected on the first few trips. Moreover, it is not hard to find ferns in the Organs at any time of the year, while in the other mountains mentioned, aside from patches of the bracken, ferns are relatively rare. Extended collecting in the Organs has served to show how widely distributed some of the ferns have become: almost everywhere one goes in the range he may find one or more kinds of the ferns peculiar to the arid region.

As would naturally be expected from the climatic conditions afforded by the range, the ferns almost all belong to the group assigned by Dr. Underwood * to the Sonoran province. Of the thirty-six species referred to this province by him, fifteen are to be found in the Organs and several of them are quite abundant.

To a collector who thinks of a plant like the lady-fern or the maidenhair when a fern is mentioned, these mountains with their peculiar fern-flora would indeed be a revelation. The preservation of the small amount of moisture annually received is of the utmost importance in the economy of these plants, and the devices used to obtain this end are exceedingly interesting: the rolling up of the pinnules and exposing a hairy, scaly, or mealy surface to the action of the atmosphere. Drying up does not hurt them, and they are ready to grow at any time of the year when the water falls and the temperature is above the freezing point.

The following is a list of the species, with notes:

Bommeria hispida (Mett.) Underw. Commonly forming mats over the warmer rocks with *Selaginella rupincola* Underw. Sonoran.

Notholaena sinuata (Sw.) Kaulf. One of the commonest species. On both calcareous and silicious rocks, in dry, warm situations. Fronds 12 to 16 inches long. Sonoran.

N. sinuata integerrima Hook. Collected thus far only on a limestone outlier of the range. Often associated with the species from which it is perfectly distinct in this region. I have never collected any intergrading forms, but Dr. Under-

* Our Native Ferns and their Allies, 65. 1893. [Ed. 4.]

wood was unwilling to raise it to a specific rank in 1897. Sonoran.

NOTHOLAENA FERRUGINEA Desv. A fairly abundant species. Fronds change noticeably in appearance with age, becoming glabrous and brownish-green on the upper surface, while the granular coating of the under surface changes from a cream-color to a ferruginous shade. Sonoran.

NOTHOLAENA HOOKERI D. C. Eaton. The commonest fern of the range and at the same time one of the prettiest. It forms large tufts on the drier and warmer hillsides, protecting itself from desiccation by closing the five lobes of the frond upward, much as one might close the hand, thus exposing the yellow, mealy, lower surface. Sonoran.

NOTHOLAENA DEALBATA (Pursh) Kunze. One of the most interesting and rarest of the ferns of the region, with its little black-stiped fronds of numerous small bluish pinnules, which are covered with a white mealy powder on the under surface. Collected thus far only on the steep cliffs of the limestone outlier above mentioned. Sonoran.

CHEILANTHES FEEI Moore. Growing in small clusters in crevices of vertical or overhanging rocks, both calcareous and silicious. Not uncommon in the mountains of the Territory though never abundant in any locality. Sonoran.

CHEILANTHES TOMENTOSA Link. Forming bunches at the bases of and partially under loose rocks in dry silicious soil and but partly protected from the sun. Frequently associated with *Notholaena sinuata*. Sonoran.

C. TOMENTOSA EATONI Baker. Associated with the species from which it is hardly distinguishable. Sonoran.

CHEILANTHES FENDLERI Hook. One of the daintiest ferns of the region. Small and with finely dissected though stiffish fronds. Common in the mountains of the Territory, though never very abundant in any locality. Sonoran.

CHEILANTHES LINDHEIMERI Hook. A characteristic fern, forming long, matted strings of vegetation in crevices in the large granite boulders which fill one of the cañons. Not common. Sonoran.

Pellaea atropurpurea (L.) Link. Under the edges of rounded granite boulders in dry warm situations. Medial.

Pellaea ternifolia (Cav.) Link. I have a single specimen of what seems to be *P. ternifolia* but I am inclined to think it is merely a starvling of the next species. Whether the true *P. ternifolia* occurs in our region is uncertain. Sonoran.

Pellaea Wrightiana Hook. One of our commonest species; grows in loose, dry soil under the edges of round granite boulders, growing best during the early spring months. Sonoran.

Pellaea intermedia Mett. Rare on the higher peaks on silicious rocks, but found also on the calcareous outlier referred to. Sonoran.

Asplenium resiliens Kunze. Found only in a few places in dryish soil under overhanging rocks where it is always cool and shaded. Austral.

Asplenium Trichomanes L. Under rocks in wet, cool, shady places near running water. Cosmopolitan.

Dryopteris Filix-mas (L.) Schott. This determination will probably have to be revised. The largest fern of the region; found only in one cool, moist cañon, where it is not very abundant. It forms clusters eight or ten inches in diameter at the base, and the fronds are frequently two feet long. Boreal.

Phanerophlebia auriculata Underw. Found only in cool, shady, moist situations in a single cañon. This locality is the most northern station for this fern yet reported and one of the four stations in the United States from which it is known. Sonoran.

Filix fragilis (L.) Underw. Rare in the higher parts of the mountains, growing in open cañons in wet soil. Cosmopolitan.

Woodsia Mexicana Fée. Rare on the higher slopes of the Organs; much more common on other and higher mountains in the Territory. Sonoran.

A. & M. College,
Mesilla Park, N. M.

NOTES ON THE FLORA OF ONEIDA LAKE AND VICINITY

By Homer D. House

The flora of Oneida Lake and its vicinity, in central New York, has a decidedly local aspect and differs greatly from that of other lakes of central or western New York. The lake is about twenty miles long, from east to west, and five or six miles wide at its eastern end. The drainage is into Lake Ontario through the Oneida and Oswego rivers. It lies at an altitude of 350 feet above the sea level.

The eastern shore is a broad beach of white sand, from 100 to 300 feet in width. This sand underlies the superficial soil for several miles to the east. It is quite evident that this extensive sandy region east of the lake must have been covered by water within recent geological times. The exposure of the sand following the removal of the original forest has produced in many places sand-plains, barrens, sandy marshes and bogs. The southern shore is also low and in many places marshy, while the northern shore is high and mostly stony. The sandy beach of the eastern shore is particularly rich in small cyperaceous plants, such as *Cyperus rivularis* Kunth, *C. inflexus* Muhl., *C. speciosus* Vahl, *C. filiculmis* Vahl, *Fimbristylis autumnalis* (L.) R. & S., *Scirpus Smithii* A. Gray, *S. Americanus* Pers., *Hemicarpha micrantha* (Vahl) Britton, *Eleocharis acicularis* (L.) R. & S., *E. intermedia* (Willd.) Schultes. Among the flowering plants, *Lathyrus maritimus* (L.) Bigel. and *Polygonella articulata* (L.) Meissn., two species which are commonly credited to the seashore and the great lakes, occur here quite plentifully. The former was mentioned by Paine in his Catalogue of Plants of Oneida County in 1865. The latter, much more abundant, was not reported by him and may be a later arrival. The sandy fields and barrens around the eastern end of the lake yield such uncommon species as *Stenophyllus capillaris* (L.) Britton, *Blephariglottis ciliaris* (L.) Rydb., *Gyrostachys gracilis* (Bigel.) Kuntze, *G. ochroleuca* Rydb., *Asclepias tuberosa* L., *Verbascum Lychnitis* L., *Viola fimbriatula*

J. E. Smith, *V. arenaria* DC. and *Botrychium obliquum intermedium* (D. C. Eaton) Underw. The finding of two or three plants of *Ipomoea hederacea* Jacq. in full bloom, upon the edge of a sandy field, seems to establish a much more northern range than has hitherto been ascribed to this species, Long Island being the northern range given in Britton's Manual.

Behind the sandy beach of the eastern shore is a dense wood of pine and oak, which, in turn, gives place further back to extensive marshes and barrens. The plants typical of the woods are *Peramium pubescens* (Willd.) MacM., *P. ophioides* (Fernald) Rydb., *Pyrola secunda* L., *Monotropa uniflora* L., *Hypopitys Americana* (DC.) Small, *Epigaea repens* L. and several species of *Vaccinium*. The region of sandy marshes and bogs is peculiar for central New York in being underlaid by pure sand, which gives a corresponding character to the flora. All of the low grounds are very rich in species of *Carex*, some rare species having been found here by Dr. Haberer, of Utica. Two other sedges, *Cyperus esculentus* and *Rynchospora alba* (L.) Vahl, are found in the marshes. Among the ferns and their allies the most interesting ones are *Lycopodium lucidulum* Michx., *L. inundatum* L., *L. obscurum* L., *L. clavatum* L., *L. complanatum* L., and *Woodwardia Virginica*, (L.) J. E. Smith. Two years ago the writer found *Dryopteris simulata* Davenp. in an open marsh about three hundred yards back from the beach and the fern has been noted there each season since. The fern grows very profusely over a limited area and this is the only station in the St. Lawrence basin, so far as I am able to learn. The marshes and woods are very rich in the commoner species of ferns. Of the trees and flowering plants the following, out of a hundred or more interesting species, seem the most worthy of note. *Nyssa sylvatica* Marsh., *Betula populifolia* Marsh., *Sassafras Sassafras* (L.) Karst., *Bartonia Virginica* (L.) B.S.P., *Decodon verticillatus* (L.) Ell., *Viburnum dentatum* L., *V. cassinoides* L., *V. nudum* L., *Aralia hispida* Vent., *Sanguisorba Canadensis* L., *Spartina cynosuroides* (L.) Willd., *Rhexia Virginica* L., *Kalmia angustifolia* L., *K. glauca* Ait. and *Mikania scandens* L. *Populus monilifera* Ait. has been reported from Oneida Lake by Paine and others.

The quiet waters of the streams tributary to the eastern end of the lake abound in such species as *Azolla Caroliniana* Willd., *Heterantha dubia* (Jacq.) MacM., *Wolffia Columbiana* Karst., *Polygonum emersum* (Michx.) Britton, *Nymphaea advena* Soland., *N. Kalmiana* (Michx.) Sims, *Sparganium simplex* Huds., *S. Americanum* Nutt., *Comarum palustre* L., *Menyanthes trifoliata* L., *Utricularia vulgaris* L., *Saururus cernuus* L. and several species of *Potamogeton.* In the shallow waters of the lake occur some of the same species found in the streams with the following, *Limnanthemum lacunosum* (Vent.) Griseb., *Sagittaria graminea* Michx., *Naias flexilis* (Willd.) Rost. & Schmidt, *Equisetum fluviatile* L., *Scirpus fluviatilis* (Torr.) A. Gray and *Roripa Americana* (A. Gray) Britton.

The occasional sandy beaches of the southern shore present about the same floral characters as those of the eastern shore. At Lewis Point is also found *Equisetum littorale* Kuehl., *E. hyemale intermedium* A. A. Eaton, and a plantain which seems referable to *Plantago halophila* Bicknell. In low marshy places *Teucrium boreale* Bicknell is abundant, and *Selaginella apus* (L.) Spring, thrives everywhere. *Dryopteris simulata* Davenp. is reported from the southern shore by Dr. Haberer. Two ferns might be mentioned here which were observed in unusual habitats, *Botrychium obliquum Oneidense* Gilbert, along the edge of high-water mark, and *Ophioglossum vulgatum* L., considerably below that mark, both rather scarce, however. The flora of the northern shore and of the western end of the lake is not so well known to the writer as that of the eastern portion of the lake. However, where sandy beaches are present the flora is without doubt similar to that of the eastern shore.

Space cannot be taken to enumerate all of the species peculiar to this region or interesting to the collector, but enough have been noted to give a general idea of the character of the flora and to show that in some respects it is of a decidedly local nature. There are no strictly maritime species present, as are found at Onondaga Lake. At the latter place several salt springs produce semi-maritime conditions. Onondaga Lake, however, lacks the extensive sandy beaches and sand barrens of Oneida Lake, which

seem very favorable for a larger local flora and for several beach-plants found elsewhere only along the sea-coast and the great lakes.

COLUMBIA UNIVERSITY,
September 15, 1903.

A KEY TO THE NORTH AMERICAN SPECIES OF INOCYBE—I

BY F. S. EARLE

The genus *Inocybe* contains a large number of species and these are usually quite well marked. It is a rather well-defined natural group but at times some of the species have been confused with *Hebeloma* and others with *Naucoria*. The plants are mostly small and are inconspicuously colored. They usually occur on the ground in the woods but some are found in pastures or other open places and in cultivated fields. A few grow on rotten wood. For the most part the species are rather local and it is evident that their number will be largely increased when the North American fungus flora comes to be better known. In the material collected within a radius of one hundred miles from New York City during the past two years fifteen or twenty forms occur that cannot be referred to any of the following species. It is probable that many of these are undescribed but publication of them is withheld for the present.

KEY TO THE SECTIONS.

1. Pileus viscid when young or moist. VISCIDAE
   Pileus dry from the first. 2.

2. Pileus glabrous or fibrillose from the remains of the veil, not rimose nor lacerate-squamose; stipe usually glabrous with the apex pruinose. VELUTINAE
   Pileus rimose, lacerate-squamose or squarrose. 3.

3. Pileus glabrous or nearly so, conspicuously radiately rimose; stipe usually pale and fibrillose. RIMOSAE
   Pileus not conspicuously rimose, but lacerate-scaly or squarrose. 4.

4. Pileus with appressed lacerate scales, or fibrillose-floccose; stipe appressed-fibrillose, subconcolorous. LACERAE
   Pileus squarrose with erect or spreading scales; stipe concolorous, squarrose-squamulose. SQUARROSAE

Key to the Species

Section Squarrosae *

1. Spores smooth. 2.
   Spores rough. 5.
2. Pileus umbonate, olivaceous-brown. *I. dulcamara* (A. & S.) Gillet
   Pileus obtuse. 3.
3. Stipe with the base bluish, reddish within. *I. calamistrata* (Fr.) Gillet
   Stipe not as above. 4.
4. Pileus uniformly pale ochraceous; stipe concolorous. *I. unicolor* Peck
   Pileus fuscous, the disk darker; stipe pallid. *I. fibrillosa* Peck
5. Stipe short, 2.5 cm. × 2 mm. *I. nodulospora* Peck
   Stipe longer, 5–6 cm. *I. stellatospora* Peck

Section Lacerae

1. Spores smooth. 2.
   Spores rough, angular, tuberculate or echinulate. 13.
2. Flesh of stipe and pileus reddish. 3.
   Flesh not reddish. 4.
3. Odor strong and persistent, sweet and pleasant, like pears. *I. pyriodora* (Pers.) Gillet
   Odor not noticeable. *I. lacera* (Fr.) Gillet
4. Small, pileus less than 2.5 cm. 5.
   Larger, pileus 2.5 cm. or more. 8.
5. Pileus white or grayish. 6.
   Pileus darker, some shade of brown. 7.
6. Stipe 1–2.5 cm. × 1 mm.; pileus 4–8 mm. *I. comatella* (Peck) Sacc.
   Stipe 4–5 cm. × 2–3 mm.; pileus 1–2 cm. **I. griseo-scabrosa** (Peck) Earle†
7. ‡ Pileus obtuse; stipe 2–3 cm. × 2 mm.; odor none. *I. subtomentosa* Peck
   Pileus umbonate; stipe 4 cm. × 4 mm.; odor farinaceous, nauseous. *I. flocculosa* (Berk.) Sacc.
8. Stipe conspicuously bulbous. 9.
   Stipe equal or subequal. 10.
9. Pileus dark brown; lamellae distant; spores 6 × 4 μ. *I. tuberosa* Clements
   Pileus yellowish-brown; lamellae subcrowded; spores 10 × 6 μ. **I. Coloradoensis** (Tracy & Earle) Earle⁂
10. Lamellae adnate with a decurrent tooth. *I. subdecurrens* Ell. & Ev.
    Lamellae sinuate or adnexed. 11.
11. Stipe short, 2–3 cm., less than the diameter of the pileus. *I. tomentosa* Ell. & Ev.
    Stipe longer than the diameter of pileus, reaching 5 cm. or more. 12.

* Some of the species included here do not fully conform to the characters of the section and should perhaps be removed to Lacerae.

† *Agaricus* (*Hebeloma*) *griseo-scabrosus* Peck, Reg. Rept. 26: 57. 1874. *Hebeloma griseo-scabrosum* Sacc. Syll. 5: 796. 1887.

‡ Numerous forms occur that do not agree with either of these species.

⁂ *Naucoria Coloradoensis* Tracy & Earle. Plant Bak. 1: 25. 1901.

12. Veil not conspicuous, soon evanescent. **I. subochracea** (Peck) Earle*
Veil conspicuous, webby-fibrillose; stipe longer and more fibrillose.
I. subochracea Burtii Peck

13. Spores spiny, echinate, aculeate or stellate. 14.
Spores angular or tuberculate, not spiny. 17.

14. Stipe fibrillose, short, 2.5 cm. 15.
Stipe subpruinose, longer, reaching 5 cm. or more. 16.

15. Pileus hygrophanous, dark brown when moist, canescent when dry.
I. maritima (Fr.) Sacc.
Pileus dry, yellowish-brown. *I. echinocarpa* Ell. & Ev.

16. Lamellae crowded, rounded behind; spores 10–12 $\mu \times$ 7–9 μ.
I. subfulva Peck
Lamellae subdistant, narrowed behind; spores globose, 12 μ. *I. rigidipes* Peck

17. Stipe more than 3 cm., ferruginous, apex white-pulverulent. 18.
Stipe less than 3 cm., pale brown, apex not white-pulverulent.
I. maritimoides (Peck) Sacc.

18. Pileus and stipe white; spores globose, nodulose-roughened.
I. infida (Peck) Earle†
Pileus umbrinous; stipe ferruginous; spores elliptic, angular.
I. lanuginosa (Bull.) Gillet

New York Botanical Garden.

SHORTER NOTES

A Question for Morphologists. — Recently‡ the theory has been advanced that the cotyledons of angiosperms are phylogenetically related to the so-called "foot" of bryophytes and pteridophytes and bear no morphological relation to foliage leaves. That the cotyledons which are primarily suctorial organs, should, under unusual conditions, enlarge, elongate their petioles, and develop much chlorophyll is perhaps no indication that they are modified foliar appendages, for the hypocotyl under like conditions also enlarges and becomes capable of photosynthesis as shown by Halsted.§ What bearing, if any, on this point, has the fact that branches may be induced to grow in the axils of the cotyledons by snipping off the plumule of the seedling? The accidental finding of

* *Agaricus* (*Hebeloma*) *subochraceus* Peck, Reg. Rept. 23: 95. 1873. *Hebeloma subochraceum* Sacc. Syll. 5: 796. 1887.

† *Agaricus* (*Hebeloma*) *infidus* Peck, Reg. Rep. 27: 95. 1877. *Hebeloma infidum* Sacc. Syll. 5: 796. 1887.

‡ H. L. Lyon. The Phylogeny of the Cotyledon. Postelsia, 1901: 55–86. 1902.

§ B. D. Halsted. On the Behavior of Mutilated Seedlings. Torreya, 2: 17. 1902.

a seedling peach with well-developed buds in the axils of the cotyledons led to experiments with beans, which ordinarily behave in a like manner, in every case producing axillary buds. Halsted records the same thing in seedlings of the Hubbard squash.

Edward W. Berry.

Passaic, N. J.

Arisaema pusillum in Pennsylvania and New Jersey. — As this interesting "Jack" has only recently been recognized as in good standing, and comparatively little has been recorded concerning its geographical distribution, a summary of its occurrence in the vicinity of Philadelphia may prove of interest.

It was first detected in Pennsylvania, so far as I am aware, by my cousin, Hugh E. Stone, who found a colony of plants in an open bog near Christiana, Lancaster County, May, 1902, a spot which furnishes the only station in the county, I believe, for *Sarracenia* and one of the few stations for *Drosera rotundifolia*.

Late in the same year Mr. Stewardson Brown found some plants in fruit at Clementon, N. J., in a wooded swampy spot, which he suspected to be this species, and in May of the present year his surmise was proved to be correct; while he also found the plant blooming abundantly near Medford, N. J., in similar shady, swampy ground. Soon after, I detected it in a shady swamp near Haddonfield, N. J., and Mr. Brown found a small colony near the Schuylkill River, a few miles above the city limits of Philadelphia. Subsequently I found it abounding in both open and shaded swamps in central Chester County, Pa., at a spot marked as the residence of J. D. Steele, in the map accompanying Darlington's "Flora Cestrica."

In some locations *Arisaema triphyllum* grew with *A. pusillum*, but the two were most readily distinguished and there was no suspicion of intergradation. *A. pusillum* is a close ally of *A. Stewardsoni*, both being late-flowering species as compared with *A. triphyllum*. Apparently *Arisaema Stewardsoni* replaces *A. pusillum* to the northward in the mountains, as we have it from various points in the Pocono region and from North Mountain, Sullivan County, Pa., where it occasionally associates with *A. triphyllum* as *pusillum*

does about Philadelphia, while it occurs in both open and shaded bogs.

A. pusillum and *Stewardsoni* may be distinguished at any stage from *triphyllum* by the shining green under-surfaces of the leaves.

Witmer Stone.

Academy of Natural Sciences, Philadelphia.

A new Bamboo from Cuba. — Among the grasses collected during the past year in Cuba was a queer member of the genus *Arthrostylidium*, which, upon investigation, proves to be undescribed. On account of the long narrow leaf-blades, quite unusual in this genus, this interesting addition to the grass flora of the West Indies has been given the name of

Arthrostylidium angustifolium. A branching shrub, climbing on bushes and small trees, with long and narrow leaf-blades and paniculate inflorescence. Stems 2–3 m. long, slender: leaves crowded at the end of the branches; sheaths overlapping, short, ciliate on the margins; ligule 4–5 mm. long, split into several long teeth; blades erect, strict, long-acuminate, 1.5–2.5 dm. long, 3–4 mm. wide, smooth and glabrous on the lower surface, the upper surface paler and rough on the nerves with very short hairs: inflorescence paniculate, slender, 1.5–3 dm. long, its branches erect and appressed, the larger 4–6 cm. long and bearing usually three appressed spikelets: spikelets linear, 22–30 mm. long, 2–2.5 mm. wide, laterally compressed, consisting of 8–12 scales which are appressed-pubescent on the inner surface; lower three scales empty, long-acuminate, much more pointed than the flowering scales; flowering scales 5–6 mm. long, about twice the length of the internodes of the rachilla, acute, ovate-lanceolate when spread out, about 9-nerved, the palet about as long as the scale.

Collected on El Yunque Mountain, Baracoa, Cuba, by Underwood & Earle, March, 1903, no. 941. Type specimen in the herbarium of the New York Botanical Garden.

The genus *Arthrostylidium* is mainly distinguished from the closely related *Arundinaria*, to which our two canes of the southern states belong, by having three empty scales at the base of the spikelet instead of two. It is confined to the tropics of America, and at present consists of about twenty species, including this new one from Cuba, nine of which are found in the northern part of

South America, including one endemic to the island of Trinidad; one, an outlying member of the genus, in Mexico; and the remaining species, ten in number, are confined to the West Indian Islands. Of these last, two are rather generally distributed throughout the islands; of the eight remaining species, five are peculiar to the island of Cuba, one to the island of Martinique and two to Porto Rico. Thus, while the genus is widely distributed in the West Indies, the species are found to be extremely local in their distribution.

George V. Nash.

New York Botanical Garden.

REVIEWS

A New Work on Ferns*

Dr. Waters has clearly outstripped all competitors in the task of producing a popular work on ferns, and, by adapting photography to the illustration of structure as well as form, he has succeeded in giving us really superb illustrations. Not only the habitat and environment of ferns, but leaf form and even the characters of sporangia, sori, and indusia are made to stand out in life-like relief. Unlike many works of a popular nature this one is thoroughly scientific and reliable in statement, and while fancy and folk-lore regarding ferns have been introduced they do not mar in any obtrusive way the value of the book. In the eighty full-page half-tones and the one hundred and fifty small illustrations, most of which also are half-tone reproductions of photographs, we have abundant illustrations of all the species of the Northeastern States so that one can easily identify all the common species from the illustrations alone. Details of fructification are beautifully brought out so that practically all that an ordinary hand-lens would give the observer is represented on these pages. Analytical keys based on the fructification and on the characters of the stipe are included. On the latter subject the author has hitherto made a valuable scientific study, the results

* Ferns: A Manual for the Northeastern States. By Campbell E. Waters. Square 8vo., pp. xi + 302. New York, Henry Holt & Co., 1903.

of which are summarized here. The topography of the work is excellent; a large clear type is used that is not painful to the eyes, the lines are well spaced, and the book has wide margins. Altogether the work is as attractive as its suggestions for study are practical and clear. Would that we had more of this sort of nature books made by real observers to take the place of much of the idle prattle of moon-struck nature-lovers aimlessly writing with a minimum of knowledge of their subject.

L. M. Underwood.

PROCEEDINGS OF THE CLUB

Tuesday, October 13, 1903

The meeting was held at the College of Pharmacy at 8 p. m.; Dr. Rusby in the chair; twenty-three members present.

There being no other business, the scientific program was taken up. This consisted of brief informal reports on the summer's work by the different members.

Dr. Britton reported having made a second trip to Cuba, leaving New York the latter part of August. He was accompanied by Mrs. Britton and Mr. Percy Wilson. In part, the same ground was covered as in his first expedition but the journey was continued into the province of Santa Clara. At Sagua a small area was encountered covered by an isolated flora somewhat similar to that found at Madruga on the first trip. Both areas were characterized by an abundance of a peculiar palm that was not seen elsewhere. The species is as yet undetermined but living specimens have been successfully brought to the Garden. Both of these peculiar plant associations are on soil areas quite different from the prevailing coral-limestone formation.

Mr. Earle reported having made a trip to Porto Rico in the interest of the Department of Agriculture during the last of May and the first of June. The trip was mostly for the purpose of noting the diseases of economic plants and a report has been submitted to the Department. One of the most interesting things observed was the occurrence of several fungous diseases of scale

insects. Two of these diseases were abundant enough to constitute efficient checks on the scales attacked.

Professor Lloyd reported having spent some weeks on the island of Dominica, accompanied by Mrs. Lloyd. He observed many orchards of limes in poor condition owing to the attacks of scale insects and wood-destroying fungi. He illustrated his exploration of the island by means of a blackboard map showing the position of three volcanic craters and of the highest peak visited, which has an elevation of 4,700 ft. A large collection of herbarium material was secured.

Professor Underwood spoke on the ferns of Jamaica. He left New York early in January, spending five months in Jamaica and eastern Cuba. Jamaica is especially rich in ferns, about five hundred species being known from the island. Of these he collected over four hundred, mostly in the Blue Mountain region, from an area about equal to that of Westchester County, New York. A hundred species may be taken along the bridle path from Cinchona to Morce's Gap, a distance of three miles. Tree ferns become abundant at an elevation of about 3,000 ft. Thirty species are more or less common. The trunks are often covered by rich growths of filmy ferns, of which about sixty species occur. The John Crow Mountains in eastern Jamaica have never been visited by botanists and the "Cock-pit Country" in the western end of the island had not been previously visited. He spent a week, accompanied by Mr. William Harris, of Hope Gardens, Jamaica, in exploring one corner of this region and found many things of interest.

Mr. Nash reported on his recent trip to Haïti. The country belongs to the negroes and a white man has to take second place. The island is 407 miles long by 195 miles wide with extremely diversified topography. There are two main ranges of mountains. Large salt lakes occur in the southern portion. In the north-central area there are large pine forests. The strand flora is much like that of the other islands but as one gets into the interior the character entirely changes and there are many endemic species. Tree ferns begin at 1,500 feet elevation but they are much more abundant at 3,500 feet, the highest point

reached by the expedition. There are no roads in the interior, only uncared-for bridle-trails and there are absolutely no bridges. One stream was forded sixteen times in a distance of twelve miles. A thousand numbers of herbarium material were secured, besides living plants and wood specimens.

Dr. Howe spoke of two months spent in Porto Rico collecting marine algae. He found the species fairly numerous but on the whole the marine vegetation was less striking and luxuriant than on some of the Florida Keys. He visited the north, west and south sides of the island but found less difference in their algal flora than he had expected. Nine hundred numbers were taken but so far most of the material is unstudied.

Dr. Murrill reported on his visits to various European herbaria for the purpose of studying types of the species of the Polyporaceae. Upsala, Berlin, Kew and Paris were visited and some time was spent in field work with Bresadola in the mountains of the Tyrol. Interesting comments were made on the different herbaria and the men who made or are now working with them.

Professor Underwood called attention to the fact that the different expeditions from the Botanical Garden during the past year had brought back fully 10,000 numbers of herbarium material.

Dr. Britton spoke of the recent death, after a long and painful illness, of Mr. Cornelius Van Brunt, who was one of the oldest members of the Club. His work in the photographing of plants was unique and he leaves a collection of over 10,000 studies on glass. He had done much in devising special lenses and appliances for this special work and his knowledge of photographic technique was remarkable. His earlier studies were with the diatoms but failing eyesight prevented his work with the microscope and he turned to photography instead. Data are being gathered for a more extended notice of his life.

F. S. Earle,
Secretary.

OTHER PUBLICATIONS

OF THE

TORREY BOTANICAL CLUB

(1) BULLETIN

A monthly journal devoted to general botany. Vol. 29, published in 1902, contained 725 pages of text and 26 full page plates. Price $3.00 per annum. For Europe 14 shillings. Dulau & Co., 37 Soho Square, London, are agents for England.

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TORREYA

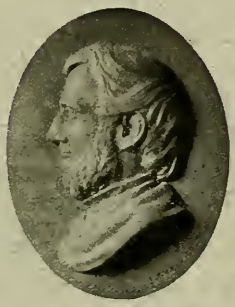
A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

MARSHALL AVERY HOWE



JOHN TORREY, 1796–1873

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Cornelius Van Brunt

Vol. 3 No. 12

TORREYA

December, 1903

CORNELIUS VAN BRUNT

By N. L. Britton

(With Portrait)

The death of Mr. Van Brunt, which took place at his residence in New York City after a painful illness of over two months, on October 1, 1903, has lost to the club one of its oldest members, and one whose contributions to botanical science were of a unique character. He was born in New York City on October 5, 1827, and was thus just about seventy-six years old. He was a direct descendant of Cornelius Rutgers Van Brunt, a Hollander, who settled on Long Island in 1653.

Mr. Van Brunt's boyhood was spent at Fishkill, New York, where he attended the village school, and he was prepared for admission to Union College, but this plan was changed and he was apprenticed to the Matteawan Machine Works. In 1853 he was interested in the organization of the Fishkill Landing Machine Works, with which he was connected until 1869, at which time he retired ; resided until 1876 in Poughkeepsie, and devoted himself to studies of natural history, to which he had always been strongly attracted. During this time he was president of the Poughkeepsie Academy of Science, to the work of which he made many scientific contributions, as well as to the Vassar Brothers Institute, carrying on also studies in mechanics and electricity. He made a trip to Florida about this time, and collected birds which were presented to Vassar College.

He entered business again in 1876, and continued in it until about 1893. Microscopical investigations were in these years

[Vol. 3, No. 11, of Torreya, comprising pages 161–176, was issued November 19, 1903.]

perhaps his favorite scientific pursuit and he became very well acquainted with the lower forms of plant life, specializing more particularly on the Diatomaceae, on which he was regarded as one of the best authorities in New York at the time the writer made his acquaintance, about 1877. He was one of the founders of the American Microscopical Society, and of the New York Microscopical Society; he was very active in the latter organization and president of it for several years, making frequent communications and exhibits at its meetings.

About the year 1886 he became interested in photography, and was one of the organizers of the Camera Club, and active in the photographic section of the American Institute. This development of his tastes was the foundation for his subsequent work in the photography of plants and flowers. He successfully conquered the difficulties of photographing flowers at close range, experimenting for many years with all kinds of lenses, plates, and developers, until he attained a dexterity in this work that has probably never been equalled. These studies were persistently and enthusiastically continued by him up to the time of his fatal illness, his work showing continuous improvement. The coloration of the lantern slides made from his negatives was undertaken by Mrs. Van Brunt about 1890, and she rapidly developed an accuracy of touch and color sense which has indeed been remarkable. The first lecture at which some of these lantern slides were used was on "Botany and Photography," delivered before this Club on April 25, 1893, followed by one on "Wild Flowers in and about New York City," delivered February 27, 1895; these sowed the seeds for the great interest in the preservation of native plants which has led up to the present concerted endeavor to protect natural woodlands and diffuse a taste for the observation of natural objects, the truest kind of nature study. During the last ten years, he has lectured on similar topics, using selections from his great accumulation of colored lantern slides, before many organizations in and about New York, and they have also been used in a few instances in other cities. Latterly he succeeded almost perfectly in enlarging photographs of minute parts of flowers, and many of these results are equal to or better than the best drawings for scientific illustration.

He was deeply interested in the establishment of the New York Botanical Garden, and many of his photographic studies were made from plants obtained there. Since the establishment of the Garden lecture courses, in the spring and autumn, the beauty of his lantern slides has been frequently admired by audiences assembled at the Museum Building, and his lectures have been among the most successful of any there delivered. He has followed the development of the Garden very closely, and since 1901 has been officially connected with it as honorary floral photographer. In addition to the organizations named above, he was a member of the New York Academy of Sciences, the American Association for the Advancement of Science, the American Museum of Natural History, the Brooklyn Institute, the American Forestry Association, the New York Horticultural Society, the American Geographical Society, the Union League Club, and the Holland Society. He was of a genial and kindly temperament, a delightful companion, full of information on all scientific topics, and his loss is deeply felt by all who have been favored with his acquaintance. His work, and that of his faithful and devoted wife, are commemorated in the beautiful *Polemonium Van Bruntiae*, which grows in the Catskill region which he loved so well, and where he spent a portion of each year. Mr. Van Brunt leaves no descendants.

EXPLOSIVE DISCHARGE OF ANTHEROZOIDS IN HEPATICAE

By F. Cavers, F.L.S.

In a recent number of *Torreya* (April, 1903), there appeared an interesting note by Dr. Cyrus A. King on the explosive discharge of antherozoids in *Conocephalum conicum* (*Fegatella conica*), in which reference was made to previously published accounts of a similar phenomenon in *Asterella Californica* by Dr. Peirce and in *Conocephalum* by the present writer. At the time of writing the note which appeared in the *Annals of Botany*, January, 1903, I was not aware of any previous accounts of such discharges,

which are not mentioned in Goebel's *Organographie der Pflanzen* or in other works on Bryophyta to which I had access. It appears, however, that the violent discharge of antherozoids in *Conocephalum* was described in 1856 by the late M. Thuret.* M. Ed. Bornet, who kindly wrote informing me of this observation of Thuret's, makes a reference to it in his "Notice biographique sur G. A. Thuret," † and it is also mentioned by M. Le Jolis in "Remarques sur la nomenclature hepaticologique," 1894, p. 130.

It has of course been long known that when the ripe antheridium of a liverwort or a moss takes up water, the mass of antherozoids becomes swollen and bursts through the antheridium-wall. In various mosses, the antheridium ends above in a well-marked cap ("Oeffnungskappe" of Goebel ‡), consisting of a single cell (*e. g.*, *Funaria*) or a group of cells (*e. g.*, *Polytrichum*). The cells of this cap become mucilaginous and on absorbing water are disorganized, leaving an opening through which the antherozoid-mass escapes. The existence of this cap and the manner in which the antheridial contents escape are indicated in Hedwig's descriptions and figures of moss-antheridia in his "Theoria generationis," 1784. For full details and figures, reference may be made to the descriptions of Goebel § and of Schaar.‖ In *Sphagnum* and the majority of the Jungermanniaceae, the antheridium is usually spherical and there is, as a rule, no apical cap, but the mode of dehiscence is essentially the same; the cells forming the upper part of the antheridium-wall become mucilaginous and absorb water, either becoming detached or cohering to form valves which curve outwards. In *Frullania*, the apex of the antheridium is occupied by a radiating series of cells which are considerably longer than those forming the rest of the wall. The writer has observed that these elongated cap-cells become

* Mém. Soc. Sci. Nat. Cherbourg, 4: 216.

† Ann. Sci. Nat. Bot. V. 2: 336. 1875.

‡ Organographie, 238.

§ Organographie, 239; also "Ueber den Oeffnungsmechanismus der Moosantheridien." Suppl. Ann. Jard. Bot. Buitenzorg, 1898.

‖ "Ueber den Bau und die Art der Entleerung der reifen Antheridien bei *Polytrichum*." Ber. Deutsch. Bot. Ges. 15: 479. 1897.

gelatinized and swell up on the addition of water, at the same time curving outwards and leaving a wide opening for the escape of the swollen mass of slime in which the antherozoids are embedded. During this year I have also had under observation a number of forms in which the antheridia are developed in cavities scattered singly along the surface of the thallus, namely *Riccia glauca*, *Pellia epiphylla*, *P. calycina*, *Aneura latifrons*, and *Pallavicinia Flotowiana*. In these forms, as in the mosses and the acrogynous Jungermanniaceae, the antherozoids were found to be discharged quietly, the slime containing them simply oozing out of the antheridial cavities. Several times in watching under the microscope living male plants of *Riella Capensis*, a mass of antherozoid-slime was seen to be suddenly expelled from the opening of an antheridial cavity on the free margin of the thallus-wing, but the force of the discharge did not send the mass to any appreciable distance (only about 2 millimeters) from the opening.

In the majority of the Marchantiaceae, the antheridia are developed in groups on specialized portions of the gametophyte, forming sessile or stalked receptacles, in the tissue of which the antheridia are more or less deeply sunk; each antheridium usually occupies a separate cavity, which communicates with a pore on the outer surface of the receptacle by a long narrow canal. Water is absorbed by (1) the cells of the tissue between the antheridia, (2) the cells forming the antheridial walls, and (3) the antherozoid-mother-cells, all of these cells having become mucilaginous. From renewed observations made this summer on male plants of *Conocephalum*, I can fully confirm the conclusion arrived at by Peirce and by King, namely, that the explosive discharge of the antherozoids from the antheridial cavity as jets of spray is to be attributed simply to this absorption of water by the cells of the antheridium itself and those of the surrounding tissue. It occurred to me to ascertain whether discharges could be induced in the case of dead plants. Male plants with well-developed receptacles were placed in absolute alcohol, in which they were allowed to remain for periods varying from a few hours to several days. They were then taken out and the receptacles moistened with water by means of a camel-hair brush. In

several cases, after a few applications of water in this way, jets consisting of the disorganized antheridial contents were observed to issue from the surface of the receptacle. With cold water, the jets were rather feeble, reaching a height of about a centimeter, but when warm water was used, jets were in several cases noticed which rose to heights of 3 to 5 cm., *i. e.*, nearly as high as in the case of living plants. This seems to afford conclusive proof that the mechanism by which these discharges are produced is simply pressure due to the swelling of gelatinized cells (or cell walls) on absorption of water; that the phenomenon is a mechanical and not a vital one. The presence of green assimilating tissue, with air-chambers and pores, in the upper portion of the receptacle, is probably to be regarded as enabling the receptacle to supply part, at least, of the plastic materials necessary in the development of the antheridia. This green tissue can hardly be now considered as playing the part in producing the discharges, by setting up an active transpiration current leading to the accumulation of water in the lower portion of the receptacle, which I was at first inclined to attribute to it. In living plants, I have found the discharges to be quite as active when the plants were placed in darkness, with slides fixed at distances of from 3 to 10 cm. above the receptacles, as in full sunlight. In my previous observations, the plants were supplied only occasionally with water, which was simply poured down the sides of the vessels in which they were growing, and the height to which the jets of antherozoid-containing spray rose was only from 3 to 6 cm. When plants were better supplied with water, especially when this was poured or sprayed over the receptacles, the jets reached a height of 10 or 12 cm. in many cases.

I have this year observed similar, though less vigorous, discharges in three other Marchantiaceous forms, *Reboulia hemispherica*, *Preissia commutata*, and *Marchantia polymorpha*. In most cases the antheridial contents were ejected with little force, simply oozing out of the pores on the surface of the male receptacle as drops of whitish slime, but occasionally, in all three plants, well-marked jets were sent up. In *Reboulia*, these jets frequently reached about 5 cm., but in *Preissia* and *Marchantia* none were observed over 2 cm.

It may be remarked that in many localities where the writer has collected *Reboulia hemispherica*, the plants were found to be nearly all dioicous, the male and female plants frequently occurring in large patches consisting only of male or female plants and separated from each other by distances varying from a few inches to a foot or more. Most European writers state that this species is either monoicous or dioicous, but in the only detailed American description which I have at hand, that given by Dr. Howe in his "Hepaticae and Anthocerotes of California" (p. 40), it is said to be monoicous. Lett, in his "Hepatics of the British Islands" (1902) states that the male receptacles occur "mostly on separate plants" (p. 16).

TECHNICAL SCHOOLS, PLYMOUTH, ENGLAND.

A KEY TO THE NORTH AMERICAN SPECIES OF INOCYBE—II *

BY F. S. EARLE

Section RIMOSAE

1. Spores smooth. 2.
   Spores rough—angular, tuberculate, or spiny. 10.
2. Lamellae adnate or with a decurrent tooth. 3.
   Lamellae adnexed or nearly free. 7.
3. Stipe with reddish fibrils. *I. subroindica* Bann. & Pk. †
   Stipe glabrous or, if fibrillate, the fibrils not reddish. 4.
4. Pileus brown with no tinge of red. 5.
   Pileus rufescent or cervinous. 6.
5. Pileus 4–6 cm.; lamellae brown; stipe brown below. *I. brunnescens* Earle
   Pileus 2–3 cm.; lamellae pallid; stipe white. *I. pallidipes* El. & Ev.
6. Pileus silky-shining, rimose; stipe pallid. *I. eutheles* (B. & Br.) Quelet
   Pileus fibrillose, becoming lacerate; stipe reddish. *I. destricta* (Fr.) Gillet
7. Pileus 4–6 cm., pale ochraceous; stipe glabrous below, subbulbous. *I. rimosa* (Bull.) Gillet
   Pileus 1–3 cm.; stipe fibrillose, equal. 8.
8. Lamellae at first violaceous. *I. violaceifolia* Peck
   Lamellae at first pallid or whitish. 9.
9. Spores 8–10 $\mu \times 6\,\mu$, unequally elliptical; stipe white-fibrillose throughout. *I. euthelioides* Peck

* Continued from page 170.

† The name is printed *rubro-indica* by Saccardo, Syll. 11 : 52.

Spores 10–12 $\mu \times 5\ \mu$, oblong; stipe pale pruinose above, brown-fibrillose at base. *I. infelix* Peck

10. Spores stellate-spinulose; pileus 3–5 cm. *I. asterospora* Quelet
Spores tuberculate or nodulose. 11.
Spores angular, not tuberculate or spiny; pileus 2–2.5 cm. *I. cicatricatus* El. & Ev.

11. Pileus yellowish-brown or lilac-brown with the disc white. *I. albodisca* Peck
Pileus uniform in color or the disc darker. 12.

12. * Pileus large, 3–5 cm.; spores obtuse-tuberculate, 8 μ. *I. margarispora* (Berk.) Sacc.
Pileus smaller, 1–2.5 cm. 13.

13. Pileus dark brown, spores about $8 \times 6\ \mu$. *I. umboninota* Peck
Pileus yellowish-brown, the umbo black-brown; spores 10–13 $\times$ 5–6 μ. *I. radiata* Peck

Section VELUTINAE

1. Spores smooth. 2.
Spores rough, angular or tuberculate. 4.

2. Spores 10–12 $\mu \times 5$–6 μ; pileus pale-fuscous, umbo darker. *I. agglutinata* Peck
Spores $8 \times 5\ \mu$. 3.

3. Stipe whitened by a silky coating; pileus mouse-color, tinged lilac. *I. murino-lilacina* El. & Ev.
Stipe glabrous, apex farinose; pileus white, yellow, lilac or brown. *I. geophylla* (Sow.) Gillet

4. Pileus white or whitish. 5.
Pileus some shade of brown. 6.

5. Pileus 2–3 cm.; spores $10 \times 7\ \mu$. *I. commixta* Bres.
Pileus 1–2 cm.; spores $8 \times 5\ \mu$. *I. paludinella* Peck

6. Pileus gray, disc blackish-brown, 8–16 mm.; spores 7–8 $\mu \times 5\ \mu$. *I. nigrodisca* Peck
Pileus uniform in color or nearly so. 7.

7. Pileus pale chestnut to ochraceous; spores subglobose, 7–8 μ. *I. subexilis* (Pk.) Sacc.
Pileus umbrinous; spores 12 μ. *I. sabuletorum* (B. & C.) Sacc.

Section VISCIDAE

1. Pileus white or whitish; lamellae white to fuscous. *I. vatricosa* (Fr.) Quelet
Pileus yellowish; lamellae pinkish-gray. *I. trechispora* (Berk.) Sacc.

SHORTER NOTES

A FERN NEW TO THE UNITED STATES. — A specimen collected in the "Cedar Hammock" of Sumter County, Florida, by Fred-

* Numerous forms occur in the neighborhood of New York City that do not agree with any of these three. They doubtless represent several undescribed species.

erick L. Lewton, September 4, 1894, and preserved in the herbarium of the New York Botanical Garden is to be referred to *Asplenium auritum* Sw., a rather variable West Indian and Middle American species, not reported hitherto from the United States. The sheet in question is not of the typical Jamaican form, but is identical with Porto Rican material represented by Sintenis, No. 4616, which does not, however, seem specifically distinct.

William R. Maxon.

Washington, D. C.

REVIEWS

Evolution and Adaptation

The reader in search of evidence corroborative of the origin of species by natural selection, or by direct adaptation will find but little comfort in Professor Morgan's recent book on evolution and adaptation.*

This author concludes that "Animals and plants are not changed in this or that part in order to become better adjusted to a given environment, as the Darwinian theory postulates." He holds that natural selection is not the moulding force that directs the development, or the origin of new forms, since among other proofs he points out that many have organs that are much less perfect than necessary, or more perfect than required by existence in a given environment.

Although new species are supposed to arise by the cumulation of minute fluctuating variations, according to the theory of natural selection, yet it is recalled that artificial selection, taking advantage of such variations, has never resulted in the formation of a new species although this method has been skilfully and rigidly applied for long periods of time. It is likewise pointed out that actual indisputable proof that any acquired character is capable of being inherited has not yet been brought forward. This is a phase of the subject comparatively easy of proof if true, and Professor Morgan is certainly justified in holding that mere asser-

* Morgan, T. H. Evolution and Adaptation. 8vo. pp. xiii + 470. *f.* 1–7. 1903. The Macmillan Company, New York.

tions and arguments are futile in dealing with a problem the solution of which is directly accessible to the experimentalist.

The author's general position could hardly be better expressed than by the following, final paragraph of his book. "If we suppose that new mutations and 'definitely' inherited variations suddenly appear, some of which will find an environment to which they are more or less well fitted, we can see how evolution may have gone on without assuming new species to have been formed through a process of competition. Nature's supreme test is survival. She makes new forms to bring them to this test through mutation, and does not remodel old forms through a process of individual selection."

The essential feature of the book, and the one that constitutes its chief claim to attention consists in the fact that the author has brought the accumulated data of his extended researches upon growth and regeneration to the test, and finds that the theories of natural selection, inheritance of acquired characters, and origin of new forms by direct adaptation are inadequate in their interpretation, while the results in question are entirely in accord with evolutionary procedure by mutation, or discontinuous variation. The power to replace lost organs, or rebuild tissues that have been destroyed, the possession of useless or injurious organs, and the incipient stages of a new organ, or the atrophied form of an old organ may be accounted for by mutation, while the interpretation of these features has been one of the ever present difficulties in maintaining the theory of natural selection. The author, as may be seen from the above, is therefore in practical accord with de Vries, the results of whose recent experiments he discusses in detail.

Professor Morgan has certainly invited grave adverse criticism on certain features of his book. The subject involves a rigid analysis of phenomena of both animal and plant life, yet we do not find that any botanist passed upon the validity of the botanical statements, so far as the acknowledgments in the preface may be relied upon. A perusal of the volume reveals ample confirmation of this fault in the preparation of the book. To say that the color of a flower is a device that secures the visits of certain in-

sects is to rehearse a timeworn, popular, but non-scientific conclusion. Again it has been established beyond all doubt that etiolative elongations of plants in darkness are not adaptations, and are in fact exhibited by a scant and meaningless majority of species. The exaggerated thickenings and elongations of etiolated organs are due simply to morphogenetic disturbances, the utility of which is in some cases pure accident. The diurnal movements of leaves are recognized as useful by the author, but he ignores the well-known facts as to the benefit of nocturnal movements of the same organs. After the same manner, botanical equations set forth by Darwin, long outlawed by the progress of the science are rehearsed and annihilated to demonstrate the weakness of natural selection. A few hours' consultation with a working botanist would have eliminated these crudities from a book, which for the most part deals clearly and sanely with the questions taken under consideration.

D. T. MacDougal.

CORRESPONDENCE

Linnaeus' Work on Ferns

Editor of Torreya :

There is an article in the October number of this journal in which an account of Linnaeus' work on ferns and his herbarium has been given, an account which contains, as it seems to me, several erroneous statements, which I cannot abstain from correcting.

I shall not enter upon any discussion about whether Linnaeus were the originator of binominal nomenclature, for this question has been settled long ago by a number of able writers in the "history of Botany"; nor shall I make any attempt to defend "the miscalled Father of Botany" (p. 147), "who must ever plead guilty to the charge of needlessly changing names already given by his predecessors" (p. 150)!

But what I wish to take up is the manner in which the author of the article, cited above, has interpreted Linnaeus' method of

preserving his "supposed" types. As to this question I wish the author had read some works by Fries, Hartman and several others, in which an account has been given of Linnaeus' herbarium, together with his method of collecting, of citing, etc. It is, indeed, a very risky matter to undertake the study of an old herbarium without previously having looked into its history, and without being more than even a little familiar with the works of the master. And noboby can expect to get any insight into botanical science as taught by Linnaeus by simply using his "Species Plantarum, 1753, as the starting 'Catalogue' of botanical nomenclature," and ignoring all the rest of his writings. Now in regard to the statement in the article, that "Linnaeus' herbarium is of comparatively little value for the determination of his types" (p. 148), it is necessary to call attention to the well-known fact that Linnaeus did not work with types. When, furthermore, the author declares "that the types of Linnaeus must very largely depend on the plates and descriptions of the early writers from which he quoted," I wish to refer to Linnaeus' own words (Mant. 2) that the synonyms are of little importance in the determination of his species; moreover that the figures which he cites, were not intended to give any exact illustration of his species, but only some idea of their general habit or aspect.

Finally I desire to correct the statement about *Osmunda Lunaria* (p. 149), that *Botrychium matricariae* is the only plant preserved as this species. The Linnaean specimen is not, as the author states, labeled *Osmunda Lunaria*, but, and in Linnaeus' own handwriting: "*Osmunda Lunaria* β," and this letter β refers to the variety in Species Plantarum, which later became *Botrychium matricariae* Schrank, thus the specimen preserved in this case well "matches the name and diagnosis."

THEO. HOLM.

BROOKLAND, D. C.,
November 11, 1903.

PROCEEDINGS OF THE CLUB

Wednesday, October 28, 1903

The club met at the New York Botanical Garden at 3:30 P. M.; twenty-six persons present; Dr. Britton in the chair.

Mr. Kenneth K. Mackenzie, of East Orange, N. J., was elected to membership.

Dr. MacDougal called attention to the abnormal fall-blooming of certain plants. In one case mentioned the spring flowering was retarded till fall, owing to the proximity of a mass of ice, this being a case of retarded development. He exhibited also plants with flowers now open that should not normally open till next spring, this being accelerated development caused by the prevailing climatic conditions.

Dr. Britton exhibited two forms of the common marsh mallow, one with pink flowers the other with white flowers with a crimson center. The first is the well-known *Hibiscus Moschentos* L. The second form is not uncommon in various localities, but has been considered merely a color variation. Recently it has been observed that the fruits of the two forms are very different, showing that they should be considered distinct species. Drawings of the fruits were exhibited. No name has as yet been proposed for the white-flowered form.

Dr. Burton E. Livingston spoke on "The Influence of Osmotic Pressure on the Cell." One of the widely accepted theories of the action of osmotic pressure is that it is comparable to gas pressure. It can act, however, only in the presence of water. Soluble salts tend to diffuse throughout a given volume of water just as gases do in a confined space. In cellular tissue there is no break in the water connection, since the cell-wall is permeable by water and by the salts dissolved in it. The protoplasmic lining of the cell is, however, only semi-permeable, since it allows the passage of some substances while preventing that of others. When living cells are transferred from a dilute medium to a denser one, the tendency is for them to lose part of the water they contain. The cell contents thus become more or less shrivelled; conversely,

when a cell is transferred to a more dilute medium it swells and becomes more turgid. Strong solutions tend to check vital activity. Removal to a dense medium often materially alters the form of growth of an organism, the tendency being to assume short thick forms in the dense medium and longer and more slender forms in the dilute one. With different substances that are not poisonous the cell seems to give the same response when a strength of each is used that would exert the same osmotic pressure, showing that it is the pressure and not the character of the substance that produces the effect. The extraction of water from the cell means the concentration of the solution of all the various salts and other dissolved substances that are contained in it. Varying strengths of the same salt are known to affect the growth of plants very diversely, and this suggests an interesting field for further investigation.

The paper brought out an interesting discussion as to the probable effect on the aquatic vegetation of a gradual change from fresh- to salt-water conditions, or *vice versa*.

Mr. Earle discussed "Generic Limits among the Agaricaceae." He called attention to the artificial character of the genera that are now recognized and the unnatural grouping of species that resulted from the use of only two or three characters as the bases of genera. A more natural grouping would require that the sum total of all the characters should be considered in defining genera.

F. S. Earle,
Secretary.

Tuesday, November 10, 1903

This meeting was held at the College of Pharmacy at 8 P. M.; Dr. Murrill in the chair; twenty-three persons present.

The committee on admissions reported favorably on the names of Miss Theresa G. Williamson and Dr. Phil. Voelkel, and they were elected members of the Club.

Mrs. Cunningham, of California, a prominent organizer in that state of clubs for the preservation of wild flowers, was present and by request exhibited a large collection of water-color sketches of Californian wild flowers and spoke briefly of the best places and seasons for finding them.

The first regular paper of the evening was by Dr. Underwood on "The Botanical Gardens of Jamaica." He outlined the history and described the present condition of each of the four public gardens of Jamaica, illustrating his remarks with numerous photographs. The first garden established was at Bath, in 1779. This is at the eastern end of the island where the climate is hot and very humid. It was virtually abandoned many years ago, but a number of interesting trees are still standing. The location was not fully satisfactory, and in 1863 another garden was established at Castleton in the Wag Water Valley, twenty-five miles north of Kingston. This is now probably the finest and most interesting botanical garden in the West Indies. It contains a very notable collection of palms, said to include 180 species. In 1868, another garden was established at Cinchona on one of the spurs of the Blue Mountain range at an elevation of nearly 5,000 feet. It was intended to test the practicability of the growing of cinchona for its bark on a commercial scale, but many other trees and plants adapted to high altitudes in the tropics were planted and for some years it was the headquarters for the botanical work of the island. Owing to its inaccessibility still another garden was established in 1873 at the Hope plantation in the outskirts of Kingston on the south side of the island. This is now the headquarters for the botanical and agricultural departments of Jamaica, and besides its features as a botanical garden proper it is used as a nursery for propagating economic plants for distribution to the planters of the island and as an agricultural experiment station for the investigation of various agricultural problems.

The second paper was by Dr. Howe on "The Flowering of the Adirondack Lakes," a phenomenon caused by the growth of one of the minute blue-green algae, specimens of which were exhibited. The substance of this paper appeared in the October issue of TORREYA.

Dr. Britton spoke of the recent discovery by Mrs. Goodrich at Syracuse of *Phacelia dubia*, a plant new to the New York State flora. This discovery extends the known range of the plant several hundred miles to the northward.

On motion, the thanks of the Club were voted Mrs. Cunningham for her interesting exhibition of flower paintings.

F. S. EARLE,
Secretary.

NEWS ITEMS

We learn from *Science* that Dr. E. B Copeland, recently instructor in Stanford University, sailed for Manila in November to become chief botanist for the United States Philippine Commission.

Dr. George T. Moore, of the Bureau of Plant Industry, United States Department of Agriculture, is spending a month in bacteriological studies in Dr. Winogradsky's laboratory in St. Petersburg.

Mr. J. A. Shafer, recently of the Carnegie Museum, Pittsburgh, Pa., has been appointed custodian of the museums of the New York Botanical Garden, and began his new duties on November 16.

Mr. Roland M. Harper is spending two or three months in Georgia, engaged in making collections of trees and woods for the State exhibit at the Louisiana Purchase Exposition at St. Louis.

Mr. C. L. Shear, of the Bureau of Plant Industry, Washington, D. C., Mr. William R. Maxon, of the U. S. National Herbarium, and Professor A. D. Selby, of the Ohio Agricultural Experiment Station, have been devoting a month to carrying on special researches at the New York Botanical Garden.

A new botanical serial, "Leaflets of Botanical Observation and Criticism," by Professor Edward L. Greene, of the Catholic University of America, made its appearance in November. The first number contains articles under the following titles, "Distribution of *Bidens vulgata*," "A new southern Violet," "In the wrong Genus," "Further Segregates from *Aster*," "Neglected Eupatoriaceous Genera," and "The Logic of it," the latter covering comments on Dr. Barnhart's remarks on "Duplicate Binomials," published in the September TORREYA.

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